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DISEASES OF THE NOSE AND THROAT

DISEASES OF THE NOSE AND THROAT

**COMPRISING AFFECTIONS OF THE
TRACHEA AND ŒSOPHAGUS**

A TEXTBOOK FOR STUDENTS AND PRACTITIONERS

BY

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WITH 18 PLATES AND 294 FIGURES IN THE TEXT

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"To study the phenomena of disease without books is to sail an uncharted sea, while to study books without patients is never to go to sea at all."—OSLER: *Books and Men*.

* * *

"La spécialité est le degré le plus bas de l'art, lorsqu'elle n'est pas fécondée par les connaissances générales; elle en est la perfection, lorsqu'elle est le couronnement de la science. Il faut finir au lieu de débiter par elle."—A. COURTY.

27607

or require exceptional skill. It is only by placing before the practitioner a comprehensive study of the whole subject that he can be helped to determine what is amiss with his patient, what he himself can do for him, and what is the most he can expect from the assistance of a specialist.

The bibliography makes no pretence to completeness. References are inserted to confirm opinions advanced, to present views I may be unable to endorse, or to support conclusions on which, at present, experience is limited. In certain instances a reference is supplied to enable the reader, if he wish, to pursue the subject further. I trust that due consideration has been given to the opinions and experience of fellow-workers at home and abroad. If they are not all mentioned individually it is only because, nowadays, every fresh fragment of knowledge is so rapidly circulated that it soon becomes common property. The illustrations have been selected from a large collection. Most of them are original; the others have been included because they represent a typical condition or because of their instructive character. I am extremely indebted to Dr. Dupuy, Mr. T. P. Collings, and Mrs. Taylor for their skill and for the care they have taken in making drawings under my directions. My friend Dr. Smurthwaite has kindly permitted me to print several of his original coloured drawings, and Mr. A. D. Reid has supplied me with excellent radiograms. My warmest thanks are due to Sir Felix Semon for the loan of some instructive coloured plates, illustrating cancer of the larynx. These appeared in the *Transactions* of the last International Congress of Medicine, but only now, for the first time, are they made generally available. I have also to thank the Royal Society of Medicine, the Schools of several London Hospitals, the Council of the Royal College of Surgeons, Messrs. W. B. Saunders Company, and several personal friends for permission to make or to reproduce individual illustrations mentioned in the text. In preparing the index, Mr. Archibald Clarke's well-known skill has been kindly placed at my disposal.

STCLAIR THOMSON.

LONDON, *May*, 1911.

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the notochord—placed a little distance behind the junction of stomodæum and foregut.

A study of Fig. 2 will explain the origin of the thyro-glossal duct, the appearance of cysts in the middle line over the front of the thyroid cartilage (*see* p. 706 and Fig. 269), and the occurrence of accessory thyroid growths at the base of the tongue (*see* p. 387).

The lingual tonsil is formed around this thyro-glossal diverticulum.

N.C.H.

Th.G.D.

Figs. 1 and 2.—The embryological air-passage.

Stom., stomodæum; *f.g.*, foregut; *p.R.*, pouch of Rathke; *i.f.*, infundibulum; *Th.G.D.*, thyro-glossal duct; *A.C.*, anterior cerebral vesicle; *M.C.*, middle cerebral vesicle; *P.C.*, posterior cerebral vesicle; *P.S.*, first cephalic flexure; *N.C.H.*, notochord; *Sp.O.*, postspenoid, and *Sp.E.*, presphenoid developmental centres, from which respectively develop (*a*) the bones of the cranial base as far forward as the sella turcica (i.e. the spheno-occipital portion of the basis cranii), and (*b*) the presphenoid or spheno-ethmoid portion; *R.*, the investing mass of Rathke.

(Kindly lent by Dr. Watson Williams)

The nose and mouth in early foetal life constitute one chamber. About the eighth week a maxillary process grows horizontally inwards from each lateral wall of this oro-nasal cavity, so as to form a partition between the nose and the mouth. On each side a median fronto-nasal plate descends from the frontal region, their lower ends dividing to form the primitive nasal pits (Fig. 3). These pits at first correspond to the vestibule, and are closed at the bottom by a layer of involuted epithelium. Failure of this fleshy septum to disappear would leave a membranous obstruction between the vestibule and the nasal chamber proper (cf. p. 109).

Imperfect union of the fronto-nasal plates in the middle line

endowed with highly important powers for the defence, not only of the air-passages, but of the body generally. These defensive arrangements will be studied best in association with the protective arrangements in the pharynx and larynx, and it will be convenient to consider the respiratory functions of the nose at the same time.

The air-stream does not pursue a straight course through the nose, but passes in the curves and eddies shown in Fig. 6.* This extended exposure to the convoluted surfaces of the nasal cavity promotes the warming, moistening, and purifying of the inspired air before it passes to the throat and lungs.



Fig. 6.—The air-currents of the nose.

A diagrammatic figure showing the path of the air-stream through the nose. 1, Frontal sinus; 2, sphenoidal sinus; 3, superior turbinal; 4, middle turbinal; 5, entrance to the middle meatus; 6, inferior turbinal. The path of the air-stream is indicated by the dotted lines. A, B, and C represent three whorls or eddies. It is seen that the air in inspiration does not take a straight course along the inferior meatus, but ascends in a curved direction into the middle and superior meatus, and then gradually descends towards the choanae. Hence nasal stenosis may be complained of if the middle meatus is blocked, even when there is a free air-way below this level. Expired air travels chiefly along the inferior meatus. Hence the difficulty of blowing secretion from the nose until it has reached the floor of the cavity. (Lambert Lock.)

The vascular erectile tissue, found on the middle and inferior turbinals and the anterior part of the septum, supplies the heat and moisture by which the air is (1) raised to the temperature of the blood, and (2) saturated with moisture before the pharynx is reached. This self-regulating mechanism provides for those two functions, whatever the temperature or humidity of the outside air may be, the turbinals varying in size according to the general

* Goodale, *Boston Med. and Surg. Journ.*, Nov. 5, 1896.
Scheff and Kayser, *Journ. of Laryngol.*, ix., 1895, p. 64.
Franke, *Arch. f. Laryngol.*, 1894, i., p. 230.
Burchardt, *ibid.*, xvii., 1905, p. 123.
Réthi, *Wien. med. Presse*, 1900, Nos. 48 and 49.
C. A. Parker, *Journ. of Laryngol.*, xvi., 1901, p. 345.

mouth-breather than to have free nasal passages with these protective mechanisms seriously damaged.

When the functions of the nose are interfered with, these protective powers are weakened. Still, when mouth-breathing becomes necessary, any organisms which are deposited on the pharyngeal mucous membrane are at once enmeshed in mucus and swept into the stomach with the saliva, of which 1 to 3 lbs. may be secreted daily. The gastric juice neutralizes most of them. But in the pharynx there is another line of defence to the body, supplied by the tonsils. The "ring of Waldeyer" is the name given to the distribution of lymphoid or adenoid tissue grouped around the cross-ways where the air and food passages intersect each other. Adenoid tissue, widely distributed in the upper air-passages, consists of a delicate reticulum of connective tissue filled with lymph-cells or leucocytes. These leucocytes may be uniformly diffused, or collected into small clusters called follicles. These, in their turn, may be grouped into larger masses, which are then called tonsils, arranged as follows (Fig. 7): 1. The palatine tonsils face one another, lodged between the pillars of the fauces, and are commonly referred to as *the* tonsils (*P,P*). 2. The group of follicles in the roof of the naso-pharynx are united in one mass in the middle line, and form the third or pharyngeal tonsil, or tonsil of Luschka, commonly referred to as adenoids, postnasal growths, or adenoid vegetations (*Ph*). 3. At the base of the tongue, on each side of the middle line, and lying in front of the valleculæ, are the flat masses of lymphoid tissue known as lingual tonsils (*l*). Some authors give the name of tubal or Eustachian tonsil to the accumulation of lymphatic follicles to be found on the posterior lip of the orifice of the Eustachian tube (*e*). Passing down from here, on each side, is a strand of lymphatic tissue, which, when prominent, may give rise to lateral pharyngitis (p. 392).

These groups of tonsils are united to form the "ring of Waldeyer" by tracts of mucosa containing well-marked infiltrations of lymphoid tissue.* Even in the larynx, there is a distinct collection of adenoid tissue in the submucosa of the laryngeal ventricle.†

Tonsils, therefore, are composed of lymphatic cells, collected into groups called follicles, and separated from one another by areas of connective tissue. The surface of the tonsil is generally irregular, being indented with crypts, or lacunæ, or with sulci. Into these open the ducts of the muciparous glands, which are

* Waldeyer, "Ueber den lymphatischen Pharynx Ring," *Deut. med. Woch.*, 1884, No. 20.

Chauveau, *Arch. Internat. de Laryngol.*, 1903, No. 1, p. 36.

† Foianini, *Archivio Italiano di Otol.*, xv., Nov., 1903, fasc. 1.

The marked development of the tonsils in the later months of intra-uterine existence, and their tendency to disappear after the first few years of life, speak in favour of their rudimentary character.* The fact that their development varies so much in different individuals, and in the same individual at different periods of life, shows that the rôle they fulfil as lymphatic glands is not a large one, especially when compared with the large number of similar glands in the body.

It would appear reasonable to regard the various tonsils of Waldeyer's ring as organs for the defence of the respiratory and digestive tracts during the early years of childhood. The ages in which they are most in evidence, their situation, their structure, the recognized emigration of lymphocytes through their epithelium, their frequent enlargement with an infectious process, the frequency with which, when their resistance is overcome, they appear to be the starting-points of infection, their lasting hypertrophy after prolonged or repeated infections, experimental observations which show that they serve as ports of entry for infection, and their normal involution at puberty, appear to confirm this view.†

The enlargement of the chain of lymphatic glands with which they connect is the effort of nature to raise a second line of defence (Fig. 7). There is no evidence that the tonsils act as blood-forming glands.

The olfactory and sensory nerves of the nasal chambers assist in the defence of the organism by putting us on our guard against evil-smelling or irritating bodies, or by hastening their expulsion by increased lachrymation and sneezing. The inclination to expectorate after inhaling an offensive odour is probably a defensive instinct. The reflex expulsion of an irritant from the pharynx by "hawking," or from the larynx by coughing, are other defensive arrangements.

In the larynx the vocal cords are unprovided with protecting ciliated epithelium, but with each act of deglutition the cords are compressed together, and the flow of mucus from the ventricles of Morgagni is driven across their surface towards the œsophagus, clearing away with it adherent impurities. In the trachea and larger bronchi there are stockades on stockades of ever-active cilia, prepared to deal with any micro-organisms which may on rare occasions penetrate so far.

* Gradenigo, "Patologia e Terapia dell' Orecchio e delle Prime Vie Aeree," Turin, 1903, p. 22.

† Kayser, *Journ. of Laryngol.*, xiii., April, 1898, p. 200.

Goodale, *Arch. f. Laryngol.*, Bd. vii., Heft 1.

Heldeson, *ibid.*, Bd. viii., S. 477.

Pirera, *Archivio Ital. di Larin.*, xx., 1900, p. 67.

R. H. Good, *Laryngoscope*, xix., No. 6, June, 1909, p. 438.

CHAPTER II

METHODS OF EXAMINATION AND GENERAL SYMPTOMS

I. METHODS OF EXAMINATION

Sources of illumination.—A good source of illumination is the first necessity for a satisfactory examination of the upper air-passages. The natural sources at our disposal are sunlight and diffuse daylight. They have the great advantage of not altering the natural colours of the parts examined. Reflected sunlight forms a perfect illuminant, if we are careful not to bring the rays to an exact focus on the mucous membrane, as this might produce a burn. Diffuse daylight is too feeble for the examination of the cavities of the nose and larynx, but it can be used for inspecting the mouth, pharynx, and ear. Direct daylight is particularly valuable for examining suspicious rashes or patches in the mouth and pharynx, and eruptions on the skin.

But some form of artificial light is indispensable. That furnished by an ordinary paraffin-lamp or a gas flame is sufficient for most purposes. The flame should have its flat side towards the observer, and be enclosed in a glass chimney, without a globe or shade. If neither of these lights is available, two or three candles tied together will suffice. For use in the study a paraffin reading-lamp or a gas-standard is equally suitable. The latter is rendered more effective by the adoption of an Argand burner or a Welsbach mantle. The oxy-hydrogen limelight is an excellent illuminant, but it is bulky and expensive. The most convenient light is that given by a 32- or 50-candle-power electric light in a frosted globe, and with the filament waved. The electric light has the further advantage that it is unnecessary to keep it constantly vertical, for, unlike a gas or oil lamp, the electric globe can be rotated so as to direct the pencil of light-rays either upwards or downwards, as well as from side to side. The Nernst electric burner gives increased brilliance. Whichever light is employed, the rays can be concentrated, and rendered more powerful, by enclosing it in a dark chimney with a bull's-eye condenser. The

The laryngoscope.—It is unnecessary to enter into detail on the physics of this instrument, which correspond in principle to those on which Helmholtz founded his discovery of the ophthalmoscope. For regular use we employ a spherical concave mirror, with a diameter of $3\frac{1}{4}$ inches, and a small eyehole at its centre. If the latter is large and oval, it is easier for beginners to manipulate; though a circular opening of $\frac{1}{16}$ inch gives a more perfect focus. The usual focal length is 14 inches, but a mirror which focuses at 8 or 9 inches is much better. In order to leave both hands



Fig. 10.—Frontal search-light.

quite free, the mirror is attached by a ball-and-socket joint to a frontal head-band or a spectacle frame. The latter is chiefly of use for those practitioners who wear glasses, as they can be inserted in the same frame. Otherwise, for general

purposes, the head-band is most convenient. The pattern of Stoerk is one of the best. This is made of webbing, and should not be elastic. It is secured with a strap and buckle, and there is a pad on the inner surface that lies over the eye and opposite to the plate bearing the socket in which the ball of the mirror moves. Some prefer a vulcanite head-band, or a metal spring to go over the vertex.

Laryngoscopic examination.—The room should be darkened, but, when a good artificial light is available, it is enough if the patient is not placed facing a strong light.

For purposes of manipulation, the patient is seated in a chair without arms to it, and preferably with a rotating seat which can be raised or lowered. The hands rest in the lap, and in many instances may be provided with a handkerchief or spittoon. The patient should not rest one arm on any table or support, as this throws up the corresponding shoulder, and may interfere with movement. He should not lean back in the chair, as then he is apt to slip forward on the seat, and so increase the distance between the surgeon's hands and the site of examination. To secure precision and avoid fatigue, this distance should not be greater than is necessary. The patient, therefore, sits well into the chair, with the whole body craned somewhat

General examination.—Before starting the technical examination of a patient, certain indications can be obtained from general observation. Thus, we may notice the exterior of the nose and configuration of the face; the appearance of the eyes and pupils; the presence of mouth-breathing and inactive *alæ nasi*; the presence of any offensive odour from the breath; the character of the voice; dyspnœa; cough; stridor (inspiratory or expiratory); pain on swallowing saliva; stiffness in movements of the neck; glands or swellings in the neck; or evidence of anæmia, wasting, or cachexia.

THE NOSE

The *alæ nasi* should be observed to see if they are well developed and mobile, or thickened and paretic. Before introducing a speculum, the vestibule of the nose, or *introitus narium*, is examined by placing the second and third fingers on the patient's forehead, while the tip of the nose is tilted upwards with the thumb of the same hand (Fig. 62, p. 109). By this method an important part can be viewed which would otherwise be concealed by the blades of the speculum.

Testing nasal stenosis.—The patency of the nasal chambers is frequently tested by inviting the patient to inspire through them. This is comparatively useless, except in cases where obstruction is almost complete; for, by voluntary effort, a current of air can be drawn through an obstructed channel which, in the absence of an effort of the will, would be quite inadequate for ordinary respiration. A fairer test is to notice how much air can be expired down each nostril, the mouth remaining closed. In testing one nostril the other one should be closed, not by compressing the *ala nasi* on that side, as this frequently tilts the septum over so as to enlarge the opposite side, but by placing the pulp of the thumb directly over the orifice of the nose. If the patient then breathes quietly through the open side, an approximate idea can be formed as to its patency. If the expired air is received on a glass mirror, some indication will be given by the area of the condensed moisture as to the width of the nasal thoroughfare, while the duration of the time it takes to evaporate indicates the volume of air.* Vulcanite with a medium polish gives a very reliable and faithful image. By placing the plate horizontally on the upper lip, half an inch from the nostrils, and giving one short and steady expiration, a well-defined steam impression results which, on evaporating, affords reliable evidence of the actual and relative patency of the nostrils.† The image may be temporarily fixed, or rendered more conspicuous for demonstration purposes, by lightly powdering it with calcined

* A. Courtade, *Arch. Internat. de Laryngol.*, xv., 1902, p. 17.

R. Itié, *Ann. des Mal. de l'Oreille*, xxxv., ii., 1909, No. 11, p. 553.

† Wyatt Wingrave, *Lancet*, Jan. 26, 1907.

maximum until the surgeon is well acquainted with its strength. Many kinds of speculum are provided with too resilient a spring. The

Fig. 12.—Anterior rhinoscopy: Manipulation of the nasal speculum.

The blades of the instrument are first directed inwards and upwards. This gives a view of the area between the points *A* and *B*.

modification of Lennox Browne's avoids this, and is a useful form. In small children it is generally impossible to make use of a speculum.

X'

Fig. 13.—Anterior rhinoscopy: Manipulation of the nasal speculum.

After being inserted, as shown in Figs. 11 and 12, the instrument is rotated, raising the extremity of the nose, and bringing into view the area between the points *A'* and *B'*. In this position adenoid growths or other conditions of the naso-pharynx may be observed by anterior rhinoscopy.

crusts may be lifted out with nasal dressing forceps (Fig. 17), or else sprayed or syringed out with a suitable lotion (p. 52).

Median and deep rhinoscopy.—The olfactory cleft and middle meatus can be brought into view by means of Killian's long nasal

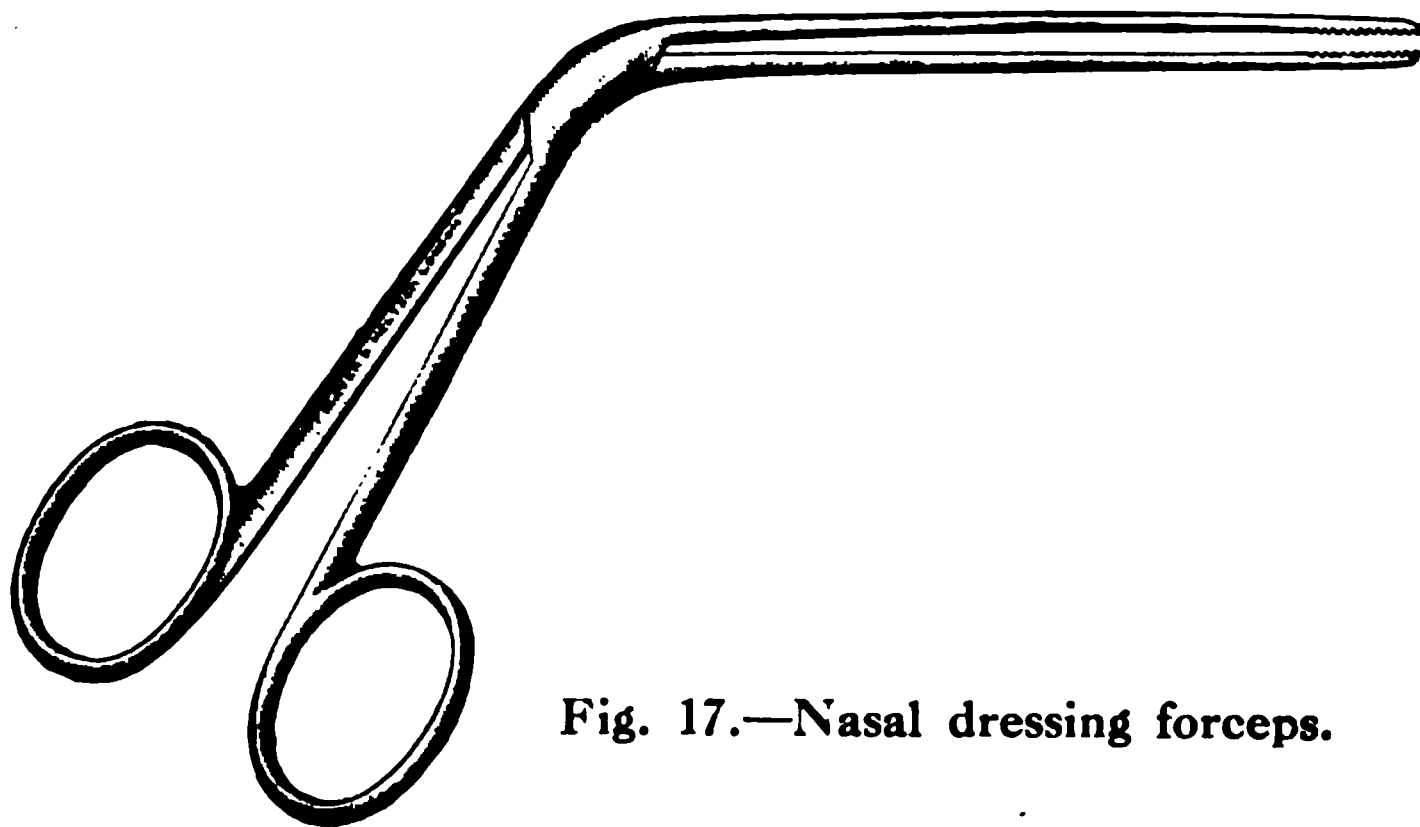


Fig. 17.—Nasal dressing forceps.

speculum (Fig. 18). The parts must first be well cocainized, and the closed blades are then insinuated between the septum and the middle turbinal. They are dilated with moderate pressure, and the instrument then pushed gently forward towards the anterior surface of the sphenoid. This is possible as the elasticity of the septum allows of its being displaced inwards, while the fragile lamella of the middle

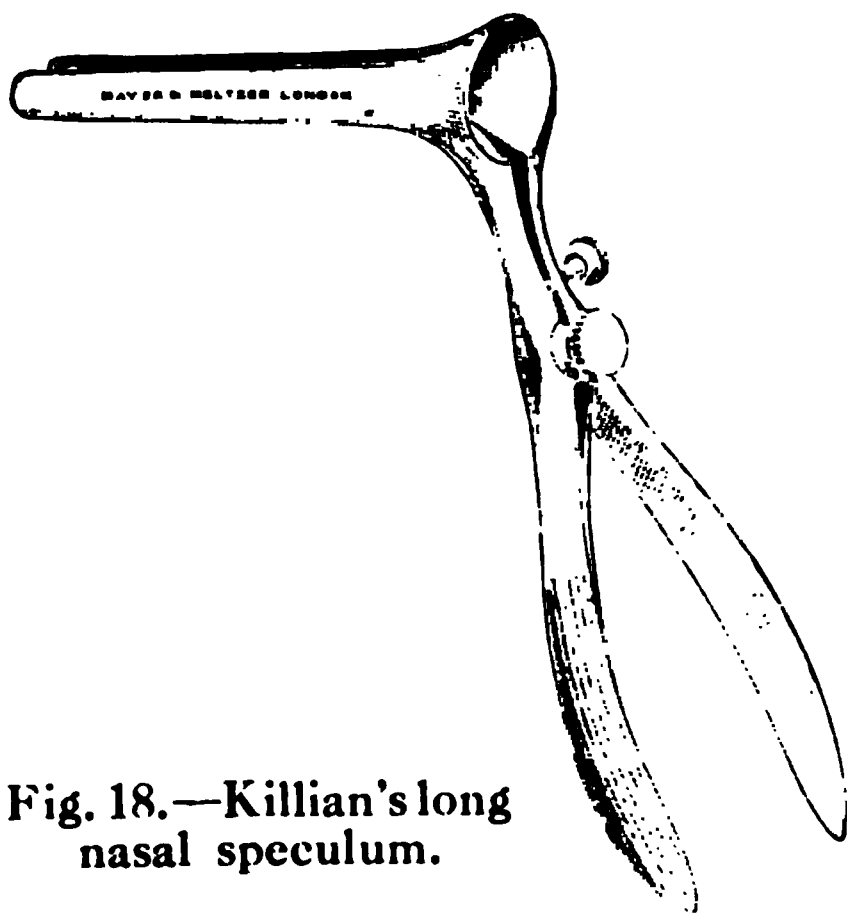


Fig. 18.—Killian's long nasal speculum.

turbinal can be bent outwards. By advancing the blades with care and patience, the olfactory cleft can be explored up to the lamina cribrosa, and the opening of the sphenoidal sinus can be inspected and the cavity sounded or washed out. A shorter instrument can, in a similar way, be introduced between the middle turbinal and the other nasal wall, so as to view the hiatus semilunaris, the processus uncinatus, the bulla ethmoidalis, the openings of the ethmoidal cells, and the entrance to the fronto-nasal canal.*

Digital examination of the nose.—When a patient

is under a general anæsthetic for operation, the little finger can be introduced into the nostril as far as the ethmoid region. The first finger can also be passed

* *Münch. med. Woch.*, 1896, No. 33.

In small children who are nervous or not accustomed to "showing their throats," or too small to be instructed, it is a much wiser plan not to use any instrument at all, as the very sight of one will often cause terror; but, having coaxed the little patient to open his mouth, the purified left forefinger is quietly slipped over the side teeth on to the dorsum of the tongue, whose movements it controls excellently, while the thumb of

the same hand is hitched under the lower jaw, and thus, without alarming either patient or parent by a display of force, the mouth is kept well in the light. The finger should be carefully disinfected at once. (Fig. 21.)

Pharyngoscopy.—In order not to fatigue the patient unnecessarily, the light is reflected on to the patient's lips before asking him to open his mouth, so that it can afterwards be quickly focused on the parts to be observed. The mouth being then opened, it will be seen that the tongue as it lies in the floor of the mouth is arched from before backwards. If the depressor is placed in front of the highest part of this arch, only the anterior

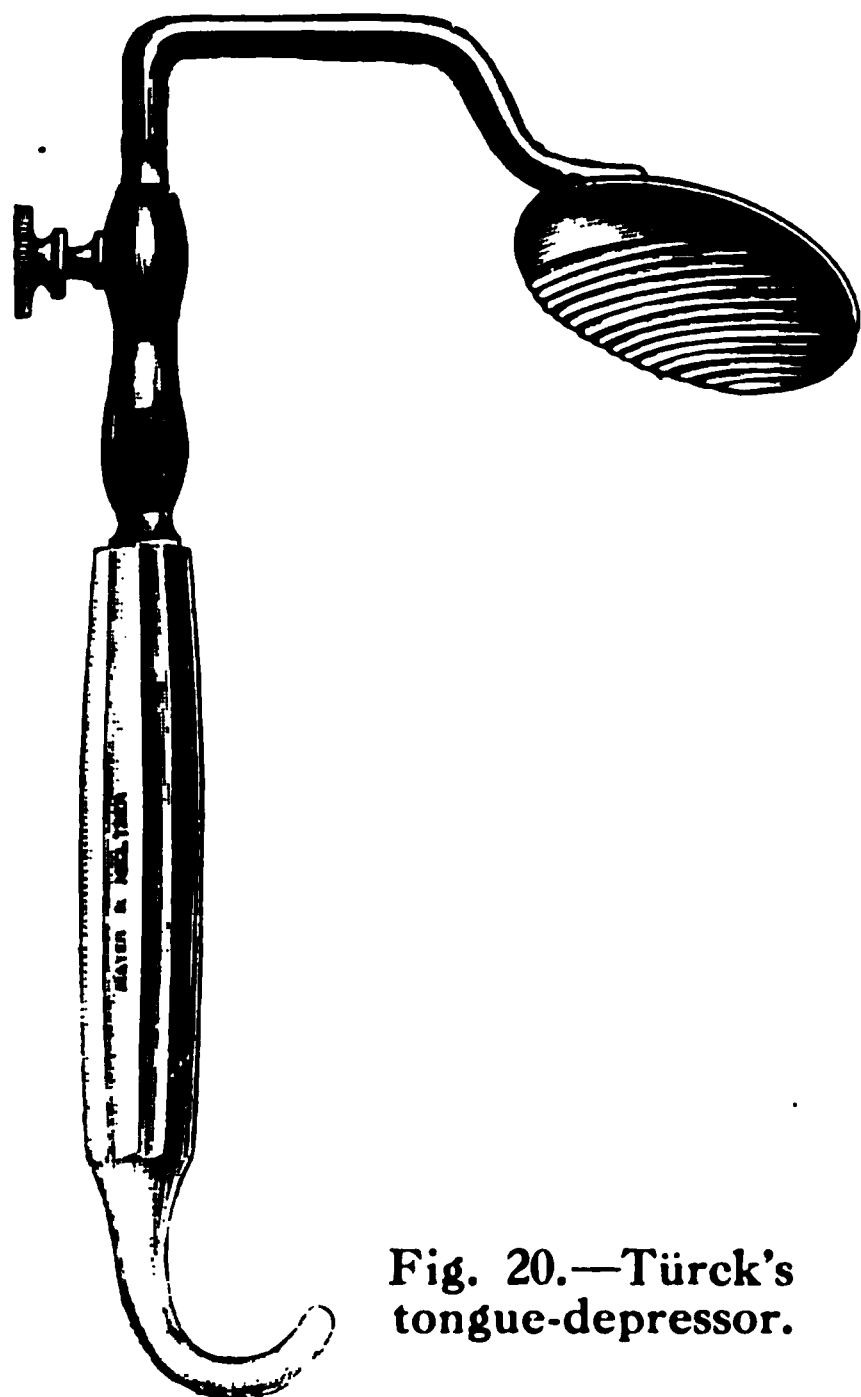


Fig. 20.—Türck's tongue-depressor.

portion will be depressed, while the region behind will rise and obscure the view more than if no depressor at all were employed. On the other hand, if the point of the depressor passes much beyond the highest part of this arch, it may slip backwards, or the tongue may be displaced forwards, and gagging be produced (Fig. 22). The depressor should not be slid over the tongue; it is gently but firmly placed flat on the surface, with the tip a little beyond the highest point of the arch. If the tongue is arched, the patient should be asked to say *Ah*, and as it recedes in pronouncing this vowel the depressor is placed in position. Once there, the tongue must not be pushed or pulled, but is

little behind it, the head is held a little forwards, and the light is reflected on to the mouth of the patient at such a focal distance that the light does not overlap the lips. As soon as the mouth is opened it will be found that the light is properly focused for examination. If the patient is asked to open his mouth before the reflected light is arranged, some time may be taken up in arranging the latter, and the patient is tired, or annoyed at being kept in suspense with his mouth agape. In order to be successful the preparations should not be made in such a manner as to alarm the patient. He is therefore encouraged to allow himself to remain passive and inert, and not to stiffen up the muscles of his throat, as he is often inclined to do. Also, instead of holding his breath

: Fig. 25.—Method of holding and warming a laryngeal mirror.

{Note that it is the glass surface, not the metal back of the mirror, which is held in the flame.

he should be asked to continue breathing without pause, through his nose if possible, and in a natural manner.

The post-rhinoscopic mirror is warmed by passing the glass surface backwards and forwards over the chimney of a lamp or the flame of a spirit-lamp (Fig. 25). A mist first forms on its surface, due to the condensation on the cold glass of the moisture in the products of combustion of the flame. As this passes off, the glass will be found sufficiently warmed not to condense the moisture of the patient's breath. It should be tested, to see that it is not too hot, by placing the metallic surface on the back of the examiner's left hand. If a sterilizer is at hand, the mirror can be warmed by dipping it in hot water. The deposit of moisture may also

If still, in spite of every effort, we do not succeed and it is very important to obtain a view, we may try the effects of a little cocaine in checking the irritability, by either painting the dorsum of the tongue and the soft palate with a little 5 per cent. solution, or spraying the same parts with a 2 per cent. solution. If this fails (and we cannot employ it in children on account of its toxic effects), we must have recourse to digital examination (p. 32). I have seldom found the self-retaining palate hooks of any service. Where they can be tolerated they are not required, and in the cases where we most need them they cannot be endured.

The difficulties met with may be due to a restive tongue, enlarged tonsils, a prominent anterior arch to the atlas, strings

Fig. 26.—Posterior rhinoscopy.

of saliva or mucus, or a sensitive soft palate. The trouble with the tongue and soft palate is specially noticeable in those who suffer from indigestion, in alcoholic subjects, and excessive smokers.

Image of postnasal space.—We have to remember that the postnasal cavity is a dome-shaped space, and, as the area which can be reflected at one time in the mirror is limited, we can only obtain a panoramic view by moving the glass in various directions. These movements should be imparted to the mirror in two planes. By rotating it around its centre in a vertical antero-posterior plane, the parts of the posterior nares, roof, and posterior wall can be viewed (Fig. 26). Then by rotating it to the right or left in a horizontal plane the lateral walls are reflected. By a combination of these movements a composite picture is made up.

an assistant. Or he may be swaddled in a large towel and held by a nurse (Fig. 37). The forefinger of the right hand, carefully purified beforehand, is inserted between the teeth on the right side (Fig. 29), passed downwards towards the base of the tongue, and then rapidly curved upwards behind the soft palate. The front of the palate should not be touched, as otherwise it is rapidly retracted and might be bruised. Once the forefinger is in the postnasal space, the walls of the cavity are rapidly explored

Fig. 29.—Digital examination of the naso-pharynx.

The patient is seated and a towel placed over the head. The surgeon stands on the child's right hand, holding the left end of the towel in his left hand, while he supports the head firmly against his armpit. This prevents the patient from rising from the chair, and so getting out of position. The patient opens the mouth, and the examiner uses his left forefinger to push the cheek inwards, between the upper and lower jaw on that side. This prevents the patient from closing the mouth, and avoids the risk of the examining finger being bitten.

If no adenoid or other growth is present, the roof and posterior wall are smooth and regular; on the anterior boundary are felt the sharp edge of the septum, the openings of the choanæ, and the extremities of the inferior and middle turbinals; while on the lateral walls the cartilaginous orifices of the Eustachian tubes are distinct. The examination can be completed in a few seconds. It is well to tell patients that it will be disagreeable, but is soon over. It should, of course, be repeated at regular intervals, till further examinations have been completed.

The **sense of smell** is investigated by holding various volatile substances (lavender, peppermint, cloves, or camphor) of different strengths to the nostrils, and noting how they are perceived by the patient. Irritating vapours, such as ammonia, or powders, such as snuff, act mechanically on the branches of the fifth nerve, and must not be confounded with bodies which stimulate only the olfactory nerve. For more accurate examination the olfactometer of Zwaardemaker may be employed.* Loss of taste is frequently complained of in nasal affections, as all delicate savours are really perceived by the olfactory nerve. The patient may suffer from an offensive smell from the nose (cacosmia), though others cannot detect it. On the other hand, if the olfactory nerve is damaged, as in ozæna, the patient may be unconscious of the fearful odour he spreads around him. Sometimes, as in syphilitic necrosis, the stench is only too perceptible both to the patient and to those about him.

THE LARYNGO-PHARYNX AND LARYNX

The protrusion of the tongue in a child is often sufficient to reveal the tip of the epiglottis. This is due to the fact that in early life the larynx is at a much higher level than in the adult, so that while in the latter the tip of the epiglottis is on a plane with the lower border of the third cervical vertebra, in a child of six years it is level with the axis, and in an infant of three months it reaches the lower border of the atlas. The same anatomical disposition explains why in early life we are often able to obtain a fairly satisfactory direct inspection of the region lying in front of the epiglottis, i.e. the base of the tongue. In some adults any projection above the surface in this neighbourhood will come into view either on depressing the tongue or on making traction on the tip of that organ. But, in the majority of cases, the base of the tongue is almost vertical and looks directly backwards; and a reference to Fig. 30 will show that it is of considerable depth, so that this region—and, of course, the whole of the interior of the larynx—is entirely concealed from direct inspection. It was only the invention of the laryngoscope by Garcia in 1855 which rendered this region visible.†

The same arrangements are required for the examination of the base of the tongue, the pharyngo-larynx, and the larynx, and the inspection of these regions is carried out in the one manœuvre. The light is disposed as already described (p. 13),

* *Arch. f. Laryngol.*, Bd. iii., S. 368.

† StClair Thomson, "The History of the Laryngoscope" (The Garcia Jubilee), *Laryngoscope*, xv., 1905, No. 3.

of these forms an excellent tongue-cloth, quite soft, adhering sufficiently to the tongue to prevent it from slipping; thin, yet not so as to permit the passage of saliva, and leaving no unpleasant sensation. As the material costs very little, it is not only safer but cheaper to throw away each piece after use, than to employ some more expensive material and have it washed. These small portions of butter-cloth will also be found useful for wiping instruments, and for a variety of small purposes.

The laryngeal mirror.—This is made on the same principles as those indicated when describing the postnasal mirror (p. 27). It is desirable to use as large a mirror as the isthmus of the fauces and the conditions of the case will allow, both because of the more complete illumination effected and the larger view embraced, and because in many cases—probably from the fewer movements which have to be given it—it will be found to excite less reflex movement. On an average, one with a transverse diameter of an inch is sufficient, though on occasions only a much smaller one can be employed. It is firmly fixed at an angle of 120° into a straight handle.

Examination.—The patient is seated as described for posterior rhinoscopy (p. 14). The lamp having been properly arranged on a level with the patient's ear, as close to it as convenient, and a little behind it, the first thing to do is to see that the light is so reflected as to be focused on the patient's lips. When this is done it will be found that, as the mouth is opened, the observer has only to move an inch or two nearer the patient to bring the rays at the proper focus below the soft palate. The light being arranged, the glass surface of the mirror is warmed as directed in posterior rhinoscopy. The patient is only then requested to protrude the tongue as far as possible, and the portion of it projecting beyond the lower teeth is enveloped in the tongue-cloth, so that both the upper and the under surfaces are protected when it is grasped by the examiner. This is done by placing the thumb on the upper surface, and the first finger on the lower, the body of the tongue being very firmly compressed (but not pinched) between them. If this grip is made too near the tip, it is much more painful, is apt to slip, and is more likely to produce reflex retraction and "rearing" of the rest of the organ. If the attempt is made to grasp the tongue too far back, we are more apt to drag the frenum against the edge of the lower incisors. This is particularly to be avoided, not only because of the entirely unnecessary pain produced, but because, in addition to setting up reflex pharyngeal movements which may entirely defeat our object, it may sever the small artery of the frenum and produce troublesome hæmorrhage. Students are generally instructed to draw the tongue gently forward. But if the tongue is freely protruded there is no need to make any traction on it. The tongue should simply be held in position outside the lips, and never dragged there. It is only in cases where the patient hesitatingly protrudes a portion of the tongue that we are entitled gently and gradually to draw it a little farther. It is still better in

then only requires that the mirror should be introduced a little farther, or inclined at an increasing angle, to bring the larynx into view. It is seldom that, with the mirror in one position, a complete view is obtained of all we wish to see. It must not only be inclined to various angles, but also directed a little to one side or the other.

As the mirror is introduced it should be seen that the observer, the mid-line of the patient, the central raphe of the tongue, and the laryngeal mirror are all in one plane. Neglect of this precaution will cause failure of proper illumination, or the larynx will not come into the field of vision. If the soft palate hangs very low, and there does not appear to be any space for introducing the mirror between it and the base of the tongue, the patient should be asked to say *E* or *Ah*, and, while the grasp on the tongue prevents it from arching upwards, the mirror is slipped back into the space formed below the contracting soft palate. The beginner is often unduly afraid of touching the soft palate, having been told that it will set up reflex contraction. As a matter of fact, there is no need to avoid mere contact with the soft palate, and in every successful laryngoscopic examination the uvula rests on the back of the mirror. Indeed, in many cases with a long or lax uvula, the back of the mirror should be slipped below it and then raised to the proper position with the uvula resting on its sloping back (Fig. 31). What should be avoided is the pinching of the uvula against the posterior wall of the pharynx, or allowing the uvula to slip over the glass surface of the mirror, or irritating it by uncertain or clumsy movements.

We thus obtain a panoramic view of the larynx, and hence any picture of the larynx is always more or less a composite one, and to some degree diagrammatic. The beginner is often unnecessarily confused by being warned that in the mirror he will see everything reversed or "upside down." As a matter of fact he will find things just as in any other mirror. This will be made quite clear by a reference to Fig. 32.

Let us start from the epiglottis, which first came into view. This is the part of the larynx which is nearest the observer. It will be noted that in the reflection in the mirror the epiglottis is the highest, and (from the obliquity of the mirror) the farthest removed. So with all the other structures—those which in the actual condition are nearest and *anterior* appear in the mirror farthest off and at the *upper* part of the mirror, while those which are situated at the *posterior* part of the larynx appear at the *lower* and nearest part of the mirror. In connexion with this we must remember that all illustrations of the larynx represent the condition of things as seen in the mirror, and not as actually in life. Hence in drawings it will be noticed that the epiglottis is always represented as being farthest removed from the observer, while the arytenoid region is the nearest. In the living subject, of course, the actual condition of things is exactly the opposite. Yet in writings on laryngeal conditions the words *anterior* and *posterior* are employed as descriptive of the actual anatomical relations, and not of their reflections.

The epiglottis is attached to the base of the tongue by the lateral glosso-epiglottic fold on each side, and the central glosso-epiglottic ligament in front. Between them lie the spaces named the valleculæ, and in front of these on each side is an area of lymphoid tissue called the lingual tonsil. Behind the epiglottis is the opening of the glottis,

or gently painting the parts—chiefly the dorsum of the tongue, the soft palate, and the fauces—with a 2 or 5 per cent. solution of cocaine. Irregular shape or position of the epiglottis sometimes interferes with a view of the larynx. It may preserve the infantile type (Fig. 35) of epiglottis, so that traction on the tongue does not lift it sufficiently to uncover the entrance to the larynx. To see past an overhanging epiglottis the observer seats himself with his head higher than that of the patient, with the laryngeal mirror somewhat deeper in the pharynx and nearer the posterior pharyngeal wall, while its reflecting surface is tilted more forwards. Various arrangements have been devised for overcoming this difficulty. One of the simplest is to use a Fraenkel depressor instead of a tongue-cloth, and press the whole organ forward and downward so as to raise the epiglottis from the posterior wall. Special instruments have been devised for introduc-

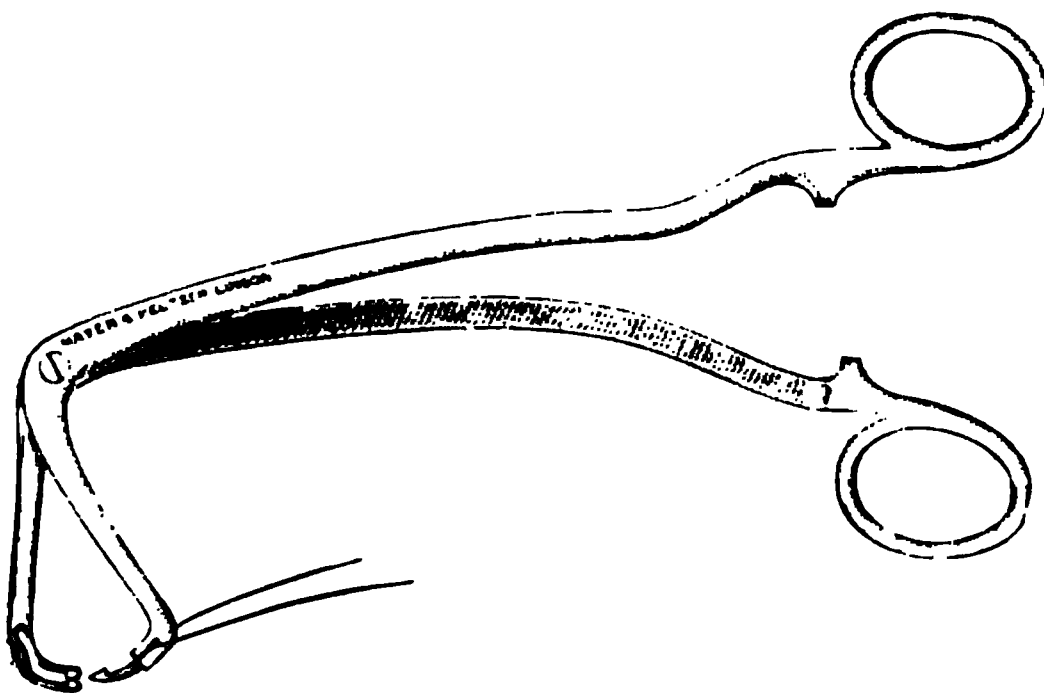


Fig. 36.—Instrument for passing a ligature through the epiglottis, so as to lift it and permit a view of the larynx.

tion down to the base of the tongue, where, by pressing on the glosso-epiglottic ligament, they will tilt forward the epiglottis. The epiglottis itself may even be hooked forward with a bent probe, if it is first rendered thoroughly insensitive by cocaine, while the patient holds his own tongue.

Various self-acting epiglottis-lifters have been designed to meet those cases where the overhang-

ing epiglottis makes it quite impossible to obtain a view of the anterior part of the cords.* I can warmly recommend the ingenious instrument designed by Cyril Horsford (Fig. 36).† Finally, in a few cases, and often with children, we must abandon the efforts to obtain a view by the laryngeal mirror and secure this by direct laryngoscopy (*see* p. 44).

Digital examination.—In some cases a satisfactory examination of the base of the tongue, the neighbourhood of the epiglottis and the entry to the larynx can be made by the examiner grasping the tip of the tongue—protected with a napkin—in one hand and sweeping the forefinger of the other over the region of the lingual tonsil on each side, the vallecula, the lower part of the palatine tonsils, the epiglottis, glosso-epiglottic and aryteno-epiglottic folds, and the sinus pyriformis. The forefinger can even, in some cases, be introduced into the larynx and serve for distinguishing the degree of induration of intralaryngeal growths. In anæsthetized children this can be done without difficulty.

* *Mémoir. Ann. des Mal. de l'Oreille*, 1906, ii., p. 39).
J. W. Gleitsmann, *Laryngoscope*, May, 1907.

† *Lancet*, July 11, 1908, p. 89.

must incline the head forwards so as to relax the muscles on the front of the neck. The laryngeal mirror is placed in the usual position.

The method has not the risks of direct œsophagoscopy (p. 47) in this region, where the ordinary examining tube might force a foreign body into the wall of the gullet, or even perforate the latter if diseased. These dangers are, however, avoided by using Mosher's or Hill's examination spatula.

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Fig. 37.—Position for holding a refractory child.

The arms are enveloped in a sheet, so that the hands are controlled with the nurse's left hand, leaving the right one free to steady the child's head against her right shoulder. His feet are tucked in beneath her knees, so as to prevent him from slipping off her lap. This position is useful in examining the pharynx, in making a digital examination of the naso-pharynx, and for intubation.

DIRECT LARYNGOSCOPY, BRONCHOSCOPY, AND ŒSOPHAGOSCOPY *

Direct laryngoscopy.—Killian's method.—When the base of the tongue is firmly depressed, and drawn forwards, it is possible in some cases, and chiefly in children, to obtain a direct view of the

* L. B. Waggett, in Albutt and Rolleston's "System of Medicine," 1908, vol. iv., part ii., pp. 299-322.

line as possible. A tube, 15 to 20 cm. long, and with a diameter of 9 to 11 mm., is sterilized and warmed, and introduced gently until it lays hold of the epiglottis, which is then tilted forwards so that the beak of the tube engages in the aditus ad laryngem. Care must be taken that the patient's upper lip does not get pinched against the teeth. With a frontal electric searchlight, or Brünings' lamp, the interior of the larynx and the movements of the cords can easily be observed.

Contra-indications.—Caution must be used in all these manipulations to avoid cocaine intoxication, particularly in children. Marked arterio-sclerosis, valvular disease of the heart, or aneurysm would add a considerable risk to these examinations. If there is extreme dyspnœa, relief should first be given by the performance of tracheotomy.

Direct laryngoscopy in children.—Killian's method is particularly suitable for children, but complete general anæsthesia is required. The horizontal position is the best, with the head well extended over the end of the table and supported by an assistant. A tube about 10 to 15 cm. long, and with a diameter of 5 to 7 mm., is employed. Owing to the smallness and delicacy of the larynx in children, it is better to use a tube with a bifid extremity. This is introduced until it reaches the front of the base of the epiglottis, and then by pressing the root of the tongue forwards the larynx is tilted into view, and can be operated on with suitable instruments. Paterson's forceps are well suited for papillomata.

Direct tracheoscopy.—In adults this may be carried out in a sitting position, after spraying or painting the pharynx and larynx with a 10-20 per cent. solution of cocaine. In nervous patients it is well to give a hypodermic injection of morphia twenty minutes before the examination is begun. The bevelled end of the tube is passed through the rima glottidis until the walls of the trachea are brought into view. All the steps are controlled by the eye, the parts being well illuminated with Brünings' lamp. In many cases a general anæsthetic is required, and of course is inevitable in children.

Lower direct tracheoscopy.—If there is an opening in the trachea direct examination can be carried out through the tracheotomy wound. The trachea is cocainized, and the patient placed in a sitting or horizontal position. The head being bent slightly backwards and to one side, a tube 5 to 15 cm. long and up to 14 mm. in width is inserted through the opening in the neck. The trachea, its bifurcation, and the entrance to the main bronchi are then plainly visible. Each bronchus is best seen by moving the handle of the instrument towards the opposite side.

Direct bronchoscopy.—It is not more difficult to introduce a tube along the natural passages into a bronchus than it is to pass it through a tracheotomy wound. A few patients may tolerate the proceeding under cocaine, but most of them must be chloroformed. In adults a tube which will extend to 30 or 35 cm. is necessary (12-14 in.); in children, one of 15 to 25 cm. (6-10 in.) length is required. Reflexes must be controlled by painting the epiglottis, larynx, and bifurcation of the trachea with cocaine. The main bronchi are painted with a 10 per cent. solution of cocaine. The right bronchus is more easily manipulated than the left. When the tube is passed 4 or 5 cm. (2 in.)

part of the mucosa of the stomach can be inspected, lesions diagnosed, and, in some cases, treatment applied.

Complementary general examination.—The examination of the nose and naso-pharynx is often not complete without a careful examination of the ears. Affections of the pharynx will frequently require an investigation of the skin for rashes or traces of syphilis. Examining the larynx may entail the investigation of the neck for enlarged glands. Paralysis of a vocal cord not only demands a careful examination of the neck, but also of the thorax and the general nervous system. Affections of the œsophagus require an exploration of the neck and chest. A laryngeal catarrh may escape diagnosis if the chest, temperature, and sputum are not investigated. In certain cases the eyes, stomach, liver, kidneys, require careful examination. The blood-examination, the testing of the opsonic index, the chemical, bacterioscopic, or microscopic examination of discharge, membrane, sputum, or removed tissue, will not be overlooked when called for.

Needless to add that the previous family history of the patient, his occupation, habits, surroundings, as well as his general vitality, will all require consideration.

The use of the Röntgen rays, both in diagnosis and in treatment, will be referred to later on.

The laryngoscopic image can be demonstrated to a class by means of the Meyer-Yonge apparatus, or by a lateral attachment to a Brünings' inspection handle.

II. GENERAL SYMPTOMS

The symptoms common to each region, as well as to each disease, will be referred to in the progress of this work. Only a few suggestive points will now be mentioned, in addition to those to be given in the chapter on Catarrh. (Chap. VI., p. 91.)

Fever.—This chiefly occurs in acute affections of the tonsils and sinuses; it is rare in diseases of the nose and larynx. It varies with the age of the patient and the stage of the disease. A continued, irregular rise of temperature should always raise the suspicion of tuberculosis. The temperature may be normal in diphtheria, and is seldom so high as in tonsillitis. If there are tonsillar symptoms without a peritonsillar abscess or other local condition sufficiently acute to explain the rise of temperature, the various exanthems should be thought of, particularly scarlatina and measles. If, in any case, the temperature is not proportionate to the symptoms, affections originating in other parts of the body should not be overlooked.

CHAPTER III

ON TREATMENT

DISEASE in the nose and throat involves both medical and surgical treatment. Drugs are employed both by internal administration and by topical applications. Surgical measures are carried out by external operations, or *per vias naturales*.

Many local manifestations of chronic infections, such as syphilis or tubercle, or of general disorders, such as cardiac, renal, or hepatic disease, chiefly depend for their relief on the recognition and treatment of the systemic disorder. In some cases—like the epistaxis of cirrhosis of the liver, the chronic pharyngitis diabetes, or the laryngeal paralysis due to aneurysm—the condition in the air-passages may call for local relief, but must be regarded chiefly as symptomatic.

Progress in this department of practice tends towards increased attention to local treatment. But evolution is sometimes seen in the opposite direction—as in diphtheria, where topical measures are now of secondary importance; or in tuberculosis, where local applications may sometimes be omitted.

The general and medical treatment of the patient can never be overlooked. It not only entails a consideration of general health, age, sex, occupation, and environment, but home, food, clothing, and habits may require investigation. Dust, alcohol, and tobacco are particularly pernicious factors in diseases of the upper air-passages. The misuse of the voice, faulty speaking and breathing, defective mastication, and neglect of care of the teeth and mouth call for special attention. In females the periods of menstruation, pregnancy, and the menopause will influence throat affections.

The general progress of surgery, improved technique, local anæsthesia, and the control of hæmorrhage, have tended to replace local medication by surgical measures. Doubtless there has been some excess of zeal in this direction. It is not right to submit to operation a patient who can be cured without. Yet in some cases local medication may be more tiresome to patients, and less satisfactory, than a suitable operation; and during the time spent

vaso-motor arrangement in the turbinals, make it important to use great care in prescribing intranasal medication.

Strong antiseptics and astringents must be avoided. All nose lotions should be alkaline and isotonic with the blood plasma, thus avoiding the painful and injurious effects of watery sprays, or those which are of too high a specific gravity. This condition is met by prescribing borax in 2·5 per cent., soda in 1·5 per cent., or salt in ·7 per cent. solution; i.e. 10 gr. of borax, 6 gr. of soda, or 3 gr. of salt to 1 ounce of warm water. Generally speaking, this is best done by prescribing several of these alkalis in the strength of about 5 gr. each to the ounce. They may be rendered more pleasant by the addition of white sugar or glycerin (Formulæ 8 and 12). The addition of a small amount of some mild antiseptic—menthol, thymol, oil of eucalyptus, oil of wintergreen, carbolic, sanitas, listerine, or euthymol,—may give a pleasant flavour. All antiseptics, however, have a slightly irritant action which is disagreeable if there is an intact mucosa, though they may be helpful in certain states of ulceration or intranasal sepsis. When the Schneiderian membrane is more or less damaged, when there are foreign bodies, sloughs, or necrosis in the nasal chambers, these or similar antiseptics can be employed, though always with an alkaline basis. Most of the proprietary nose lotions are made up on the above alkali basis, with the addition of various aromatic antiseptics. (Formula 10.)

Nose lotions should be employed tepid (102° to 106° F. = 39° to 41° C.). They may be commenced at 35° C. (96° F.), but the nose can be accustomed to 45° C. (112° F.) or 48° C. (120° F.); the warmer the better, as heat reduces the congestion of the turbinals and stimulates phagocytosis. As the skin of the nose is more sensitive to heat than the nasal mucosa, the warmer lotions must be used from a glass pipette or nasal syringe. If used in a spray, the temperature may be disregarded, as the liquid is slightly warmed by spraying, and the chilling of the mucous surface is less rapid.

Methods of use.—Lotions may be sniffed, irrigated, syringed, or sprayed into the nostrils.

The nasal douche (Weber's) is generally condemned, from the risk of pressure driving the fluid into the Eustachian tube, and setting up otitis media. If the reservoir is not raised more than a foot above the patient's head (Fig. 39), this danger can be avoided when the following rules are observed. They are applicable to the use of all watery lotions in the nose :—

1. The fluid should be tepid and sterile.
2. If both nostrils are affected, the fluid is first directed along the obstructed side.

The patient pours the liquid into the palm of one hand and sniffs it up through the nostril on the same side, while the other orifice is closed with the forefinger of the opposite hand. The process is then reversed. If the head is inclined forwards after each sniff, the fluid readily escapes and the nostril is cleared as described (p. 51). If the depth of the nose or the naso-

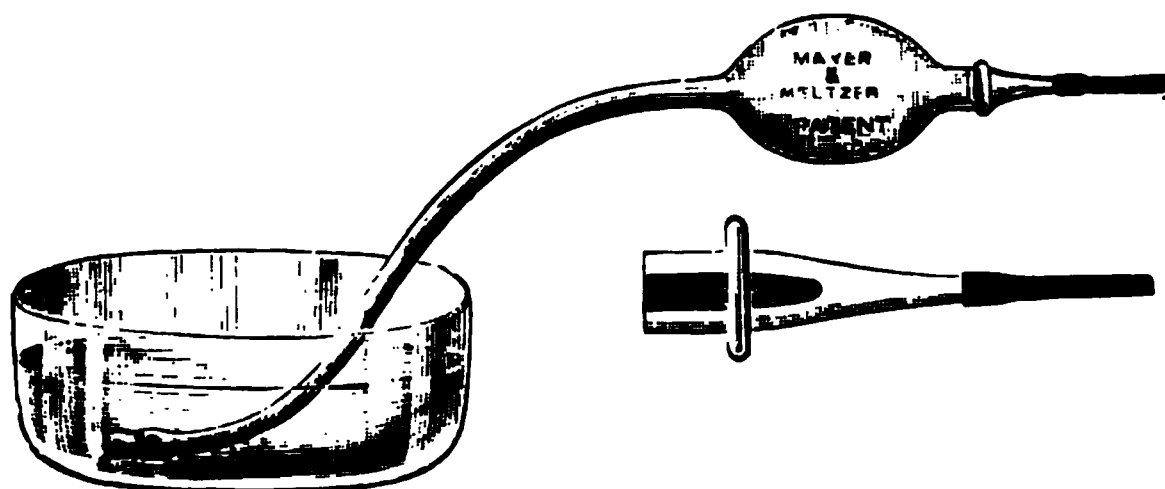


Fig. 40.—Higginson syringe for cleansing the nose—W. Wingrave's modification.

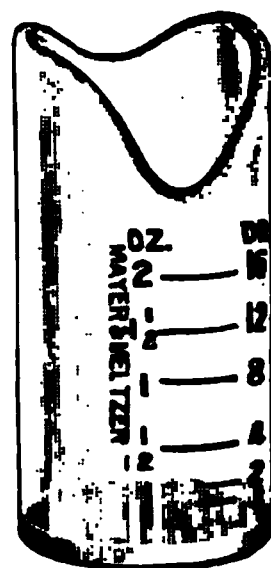


Fig. 41. Nasal cup.

pharynx requires washing, the face is tilted upwards, and the fluid runs into the pharynx and is hawked out through the mouth.

The objection to this method is that it is not a very aseptic proceeding. As a matter of practice, except after operations in septic conditions, this objection is theoretical. But it is avoidable by the use of an irrigator (Fig. 40), or a nasal cup or nasal bath (Figs. 41 and 42). In hospital practice, as a substitute for the latter, the patient can be instructed to purify the lower part of a soap-dish, and use it as directed, instead of the palm of the hand. Children can generally be coaxed to sniff the fluid out of a purified tablespoon.

Syringing the nose is required when a stream of lotion has to be directed with some force, generally for detaching crusts in the nasal or postnasal space.

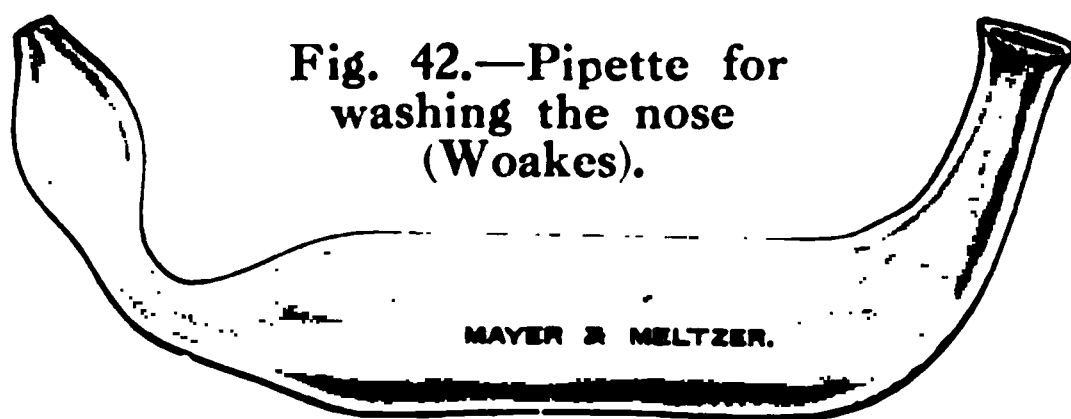


Fig. 42.—Pipette for washing the nose (Woakes).

A one-ounce, all-rubber, pear-shaped syringe is employed (Fig. 43), or an enema syringe holding 3 to 4 ounces. Care must be taken that discharge is not sucked back into the ball; if this occurs

it should be filled with carbolic lotion to purify it. This possibility is avoided by using a Higginson syringe.

A spray, driven by a single ball, is a good and safe method of applying watery lotions in the nose. It is most suitable when only the anterior part of the nose requires medication. (Fig. 44.)

THE NASO-PHARYNX

The naso-pharynx in health is kept clear by the protective mechanisms of the nose, and its natural mucus passes uncon-

syringe, or a small syphon douche. If the patient first takes a deep breath, and then expires slowly through the open mouth, the region of the tonsils, fauces, soft palate, and pharynx can be thoroughly irrigated by a good flow of fluid, of which the impact has a valuable mechanical effect in many conditions.

Gargling is the ordinary method of medicating this region, but it is doubtful if the fluid ever reaches the lateral or posterior walls of the pharynx. A few become expert at it by simulating the action of deglutition without actually swallowing the liquid.

THE LARYNX

The larynx can be washed out with a suitable syringe, under the control of the laryngeal mirror. The patient holds his own tongue, and is directed to take a deep breath and then say a prolonged *E*. This prevents the liquid from entering the trachea, while it is distributed on the vocal cords and flows all over the *aditus ad laryngem*. The larynx is sprayed in the same manner; when the patient finishes a long *E* he should be directed to close the mouth and take deep breaths in and out through the nose. This helps to prevent laryngeal spasm. (Fig. 45.)

Fig. 45.—Method of using a laryngeal spray.

The instrument is manipulated entirely by the right hand, leaving the left free to hold a laryngeal mirror. The tip of the instrument should be short and bent at a little less than a right angle. This helps to avoid contact with the epiglottis, and allows of the spray being directed downwards and forwards—which is the axis of entrance to the larynx cf. Fig. 31).

The solution can be warmed for acute conditions. The cold liquid is probably more effective in chronic disorders.

OILY LIQUIDS

Oily liquids require a special nebulizer. This is not only suitable for puffing the oil spray into the nasal chambers, but if the mouth is held open it is of sufficient force to drive it through

forceps and brushed backwards and forwards, or left *in situ* for a few minutes.

In the **naso-pharynx** the cotton-wool can be held in a small pair of adenoid forceps (Fig. 170, p. 313), or twisted securely round a suitable carrier (Fig. 46). After soaking it in the liquid ordered, any surplus fluid is squeezed out, the tongue is depressed with one hand, while the other directs the carrier backwards. Once behind the lower border of the soft palate, the cotton-wool extremity is turned quickly upwards before the palate retracts upon it, and is swept over the roof and sides of the space. No force is employed; the soft palate must be pendulous and should not be irritated. The proceeding is facilitated by spraying the soft palate and fauces with a 2–5 per cent. solution of cocaine.

The **pharynx** is the region where pigments are most extensively used. The surface is first freed from mucus, employing an alkaline spray if necessary, and then dried with cotton-wool mops. The paint may be taken up on a pledget of cotton-wool or on a cotton-tipped probe. It is thus supplied to the affected area and gently held in position for some time without irritating the patient. The application may have to be repeated till the desired effect is produced. A common error is to suppose that throat paints should be “rubbed in.” This

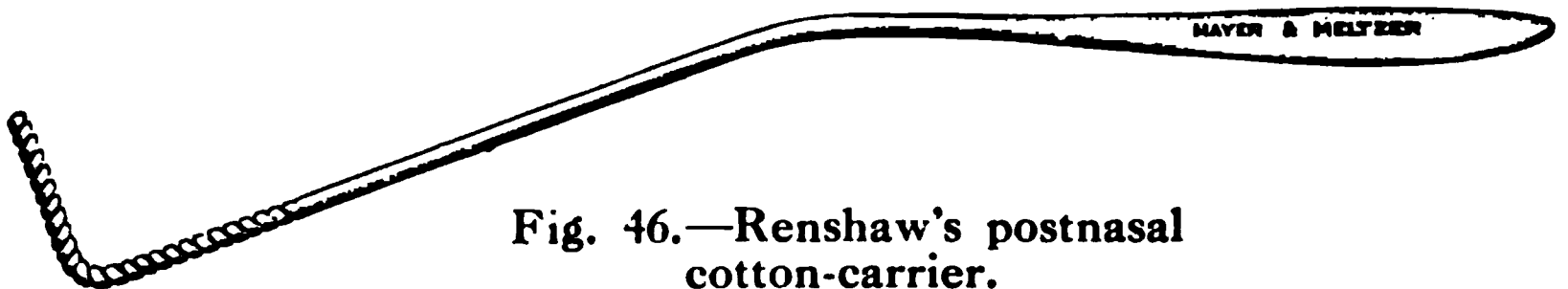


Fig. 46.—Renshaw's postnasal cotton-carrier.

only irritates the pharynx, producing a free flow of mucus and also swallowing movements which prevent any local action of the pigment. When used on the tonsil, the mop should be gently pressed against the upper part (i.e. the entrance to the supratonsillar fossa), so that the paint is squeezed outwards and flows downwards over the tonsillar surface.

In many pharyngeal conditions a pigment can be effectually and pleasantly replaced by a lozenge.

INSUFFLATIONS

Powders can be insufflated into the upper air-passages by different powder-blowers. The Kabierski and De Vilbiss models are convenient for the nose and pharynx, and that of Spiegel is suitable for the postnasal space and larynx (Figs. 47 and 48).

In the nose.—The intact nasal mucous membrane is as intolerant of medicinal powders as of other foreign bodies. Ciliated epithelium expels a small particle of solid matter at the speed of one inch per minute; * its expulsion is hastened by the secretion stimulated in the mucous and lachrymal glands, and sometimes by sneezing. It is therefore probable that sedative or astringent powders when blown

* StClair Thomson and R. T. Hewlett, *Lancet*, Jan. 11, 1896.

In the larynx.—The larynx is only partly lined with ciliated epithelium, and insufflations are indicated when sedative, analgesic, astringent, or antiseptic effects are desired in the region of the vocal cords or interarytenoid region. In certain cases these effects are better secured by using lozenges or sprays.

Method.—Powders are insufflated into the larynx in the manner described for the use of the spray (p. 56).

With the simple glass tube designed by Leduc, some patients are able to inspire a powder directly into the larynx (Fig. 49). The short end is introduced well back into the pharynx, below the soft palate,



Fig. 49.—Leduc's tube, for inspiring powders into the larynx.

and directed towards the glottis; the other end is held close to a pinch of the powder. With the lips closed lightly round the glass stem, a few quick inspirations are made, and it will be found that the powder is distributed over the cords, ventricular bands, and interarytenoid region.*

TROCHISCI

LOZENGES, PASTILLES, AND COMPRESSED TABLETS

These are chiefly employed for their action in the mouth and pharynx, but, by local absorption, those of a sedative character are beneficial in many laryngeal troubles, while some containing volatile substances, such as menthol, exert an influence even in the nose. Some lozenges take too long to dissolve in the mouth, while others spoil the appetite and upset the digestion; the larger (gr. v) chlorate of potash tablet has been the chief offender from both these points of view. Those of the Pharmacopœia can be broken up so that a small portion is taken at a time. It is better to direct that lozenges be taken after meals.

STEAM INHALATIONS

These are useful in many acute affections of the nose and throat. The patient is directed to pour a pint of steaming, but not boiling, water into a quart jug, and then to add to it a teaspoonful or more of the medicament ordered. The mouth of the jug is covered with

* Dundas Grant, *Journ. of Laryngol.*, xxi., Sept., 1906, p. 420.

CAUSTICS

Caustics are frequently required in treating diseases of the nose and throat. Amongst those most generally employed are the galvano-cautery, chromic acid, trichloroacetic acid, nitric acid, acid nitrate of mercury, pure carbolic acid, nitrate of silver, lactic acid, salicylic acid, and chloride of zinc. Long-continued use of nitrate of silver should be avoided, as argyria has resulted from local applications.*

THE GALVANO-CAUTERY

The employment of this convenient form of caustic has been greatly abused, but it is extremely serviceable if a recognition of its method of action is kept in mind.

The current for heating the iridio-platinum points can be obtained from a plunge-battery, an accumulator, or direct from the street current through a suitable adapter, by which it can be utilized for light, cautery, or motor purposes. The electrode employed for the nose is straight and short; for the pharynx it is straight and somewhat longer; while for the naso-pharynx and larynx several sizes, suitably curved, will be required. In most cases the point



Fig. 51.—Cautery-point; shape and size most generally useful.

should be small, as it allows of finer and more precise work (Fig. 51). The large assortment of electrodes frequently sold with a battery are seldom necessary. When an extensive surface requires treatment it is better to apply the cautery to several points, instead of scarring a larger area with a big electrode.

Action.—The galvano-cautery destroys any soft tissue with which it comes in contact. But as this is done by burning, a wound of low vitality is left covered with a slough which forms a suitable septic nidus, and the heat and steam evoked irritate neighbouring tissues. Care must therefore be taken to apply the cautery with due antiseptic precautions; the slough must be watched; and time has to be allowed for it to separate—generally seven to ten days—and for subsequent healing to take place. The reaction produced beyond the cauterized area stimulates fibrosis, which is the desirable result aimed at in causing contraction of chronic hypertrophy of the turbinals or tonsils, or in arresting lupus or tubercle.

* Ménéau, *Arch. Internat. de Laryngol.*, xii., 1899, No. 1, p. 31.

and the outer nasal wall may be caused when opposing surfaces are charred.

In the *pharynx*, care should be taken that the soft palate does not suddenly descend on the hot barrel of the electrode, and that the patient does not start backwards and injure the tongue and lips. A troublesome dry pharyngitis is sometimes left when the cautery has been too freely used in such conditions as granular pharyngitis, or unsuitably employed, as in sensory neuroses. When applied to the tonsils, care has to be taken not to burn the faucial pillars, and so cause adhesions.

Some observers hold that in the *larynx* the use of the electric cautery is attended with the risk of acute traumatic oedema. This accident is generally due to want of sufficient care and skill. Still, it is well that little should be done at the first sitting, until the tolerance of the patient can be judged. Complete anæsthesia of the larynx, with the pharyngeal reflexes thoroughly under control, is required, so that the cautery-point can be applied under full illumination. Charring of healthy parts may occur if the larynx suddenly contracts and grips the heated electrode.

CHEMICAL CAUSTICS

Chromic acid will frequently serve as well as the galvano-cautery, and in some cases is preferable. It can be used in solutions of the strength of 10 or 20 gr. to the ounce, in a saturated solution, or the dry crystals may be fused on a probe. The end of the probe is warmed in the flame of a spirit-lamp and dipped into the crystals, when a few will adhere. The part of the probe just beyond is next warmed; the heat of the metal will cause the crystals to melt, and, on cooling, to adhere closely in a red coating. If the crystals themselves are passed through the flame, they are apt to be reduced to a black ash which has no caustic action.

In addition to the precautions required with the galvano-cautery, care is taken that no excess of the liquid is used or that the fused acid is not detached. If the yellow staining of the chromic acid is seen to extend beyond the desired area, it is wiped away with moist cotton mops, or neutralized with a solution of bicarbonate of soda (gr. xxx to 3i).

Trichloracetic acid may also be used on the end of a probe, but the crystals are difficult to preserve without deliquescence. The end of the probe can then be very lightly dipped in the liquid and passed over the surface to be cauterized. If this has been well dried beforehand, the acid will not diffuse far—otherwise its action must be neutralized with an alkaline solution.

pharynx the instinct of the patient impels him to avoid deglutition in many acute painful affections. When such affections are of temporary duration, there is no gain in opposing this feeling. In malignant disease of the œsophagus requiring a gastrostomy, local relief, and even some recovered power of swallowing, may follow the local rest obtained by this operation. The rest obtained by more or less complete silence is often of marked value in laryngeal disease, and will be referred to later on. Similar benefit to the larynx is frequently noticeable after tracheotomy.

LOCAL ANÆSTHESIA : COCAINE

There is no department of practice in which the services of cocaine are so often required as in rhinology and laryngology, so that it seems desirable to give some special consideration to the properties, methods of use, indications and dangers of this drug.

Cocaine is employed in the form of its most useful salt, the hydrochloride of cocaine. This is soluble in water, glycerine, and alcohol.

Action.—Cocaine produces both local and general effects.

Locally cocaine is (*a*) an anæsthetic, (*b*) a powerful vaso-constrictor, and, consequently, (*c*) produces local anæmia. The insensibility is more complete the more perfect the contact between the drug and the nerve-endings, and therefore it is more thoroughly produced when it is used on mucous membranes which are thin and richly supplied with nerve-endings. It is for this reason that local anæsthesia can be more readily induced in the nose than in the pharynx or larynx.

The two other local actions are as important as the first, for, by retracting the tissues and reducing the hæmorrhage, cocaine facilitates examination and operation. These results are followed by a secondary vaso-motor congestion, and as this sets in the anæsthesia passes off.

The *general* effect of cocaine—which is manifested even when topically applied to a mucous membrane—is first felt by a pleasurable sensation as of a slight degree of alcoholic intoxication. There is as a rule a feeling of cheerfulness and lightness, manifested by vivacity and loquacity on the part of the patient. When the dose absorbed is slight the general symptoms may stop at this point. If the intoxication is more decided, the patient becomes pale, cold, faint and giddy, complains of nausea, and breaks out in perspiration. The pulse is small and quick, increasing rapidly to 140. The pupils may dilate and cease to react when the light from the frontal mirror is reflected on them. This is a sign of deeper intoxication. In some cases, without apparently passing through the stage of excitement, the patient passes into a condition of abnormal calm, and the first thing that may be noticed the matter is that he is sitting in a limp and apathetic manner, observing nothing and making no resistance to the manipulations to which he may be submitted, until, in some instances, he falls forwards in a dazed and semi-conscious condition.

These effects may pass off in a few minutes, or may last some hours. In other instances they continue for days, during which the patient

or brandy. Strong smelling-salts may be held to the nostrils. Meantime the windows are thrown wide open; and if it happens that the patient has not had any food for some time, a little strong black coffee can be prepared.

In the milder cases, and in nearly all those where the proper prophylactic measures have been taken, these remedies will be found quite sufficient. But as a certain amount of faint-feeling remains for some hours, no further examination or treatment should take place that day, and at the next visit greater precaution should be taken in employing the drug.

In the severe forms of cocaine poisoning we may give an inhalation of 3 to 5 drops of nitrite of amyl, which can always be conveniently kept at hand in hermetically closed glass capsules. It restores the colour to the face, and diminishes the arterial tension, but its effect is transitory. The same may be said of trinitrine, which can also be kept at hand in the form of chocolate tablets containing $\frac{1}{100}$ gr. each. More permanent results can be obtained by a hypodermic injection of $\frac{1}{8}$ to $\frac{1}{4}$ gr. of hydrochlorate of morphia, or by the administration, by the mouth or rectum, of chloral, which is a still more marked physiological antidote of cocaine. The tetanic contraction of the diaphragm is warded off by the inhalations of chloroform, while the heart is stimulated by alcohol and hypodermic injections of caffeine, ether, or strychnine. Breathing may have to be maintained by artificial respiration, or by Laborde's method of rhythmic traction on the tongue. Throughout the treatment—which should be continued perseveringly and never despaired of—the patient must be kept strictly horizontal, with the head low and the extremities warmed, and he must not be depressed by the exhibition of alarm on the part of those around him.

Prophylaxis.—Patients who are fatigued or fasting are apt to suffer from the general effects produced by the absorption of cocaine. Children are particularly susceptible. It is a good rule to avoid using it in patients under the age of 6, and not to employ it as a routine of practice except in those over 12.

Women, especially if pregnant or nursing, are more susceptible to the drug than are men. It should be used with the greatest circumspection, particularly on a first occasion, in those who show any dread of the drug or of the local measures associated with it. Those who are frightened, nervous, hysterical, or excitable show special predisposition to its effects.

In elderly subjects it should be used with great care, and it is only exceptionally that it should be tried in those with cardiac affections, while angina pectoris is an absolute contra-indication.

compressed tablets containing 1 gr. each of cocaine. With these at hand a fresh solution can be prepared on each occasion, and the exact amount of drug used is known. One tablet dissolved in 20 drops of boiled water will make a solution of 5 per cent., enough for a first examination. Once the tolerance of the patient has been tested we can use 5-gr. tablets, dissolving one in 50 minims to make a 10 per cent. solution. With the precautions already indicated, however, and with solutions prepared and used in the manner described farther on, this precaution with regard to exact dosage is almost superfluous, except when using it on patients for the first time, or in very sensitive subjects.

Strength of solutions.—The solutions of cocaine vary from 1 to 20 per cent. The feebler strengths are used in sprays and simply when it is required to soothe a hypersensitive condition of the tongue or pharynx. The strongest preparation, that of 20 per cent., is seldom wanted except for operations on the larynx. Some observers are of opinion that there is not only more local effect from a strong solution, but that the amount which is absorbed is much less. Still, for all ordinary purposes it may be safer to use a solution of 10 per cent., which is also enough to produce a sufficient anæsthesia.

Preparation of solutions.—Solutions have the drawback that they cannot be sterilized without decomposing the salt, and they decompose quickly. In such a short space of time as three days alterations take place, and not only are the anæsthetic properties of the drug diminished but toxic products are evolved. The solution becomes turbid, algæ form, and the salt crystallizes round the neck of the bottle. For practitioners who do not require to make almost daily use of cocaine, the employment of it in the tablet form already mentioned will prove the most satisfactory. For those who require to keep a solution ready made for frequent use, it can be preserved by adding to each ounce of solution a little salicylic acid, resorcin, or thymol (*see* Formulæ 1 and 2).

Methods of use.—A small region can be anæsthetized by placing a few crystals of the cocaine on the spot, where they are dissolved by the mucus. For all ordinary purposes it is better to be provided with a solution which can be used as a paint or spray, or injected endermically.

In the nose a 2-5 per cent. solution may be sprayed into narrow nostrils to facilitate examination. It is a better plan, particularly for treatment, to moisten pledgets of cotton-wool or gauze with a 10 per cent. solution, and place them in direct contact with the part to be operated on. The addition of a little suprarenal extract

Owing to its very slight toxic effect it is more suitable than cocaine for infiltration anæsthesia (*see* p. 724).

Alypin, in doses approximately the same as for cocaine, has been used as a substitute in endermic injection.

Stovaine is claimed to be only half as toxic as cocaine, and to be equally effective in solutions half as strong.* The absence of vaso-constrictor action makes it a less suitable drug in this department of practice.

Novocain promises to be the best substitute for cocaine. Over the latter drug it has the advantage that its solutions keep without deterioration and can be readily sterilized. It is said to be six times less toxic than cocaine, and to act more quickly and produce an equal degree and longer duration of anæsthesia. Novocain is applied to the mucous membrane in solutions of the same strength as indicated for cocaine. For infiltration anæsthesia, 0.125 grm. is employed, dissolved in 25 c.c. of normal salt solution to which suprarenal extract can be added. Novocain-suprarenin tablets contain $\frac{1}{2}$ gr. of novocain. One or two are dissolved in 33 minims of hot water, to make a 1 or a 2 per cent. solution. As many as three tablets (1 gr. novocain) may be used at one sitting.† I find that novocain is not so effective as cocaine, but it may serve as a substitute where the latter drug is contra-indicated, particularly in elderly subjects.

Cocaine, alypin, and stovaine are precipitated by sodium carbonate and by borax, but novocain is compatible with these substances and with potassium iodide.

Orthoform. Anæsthesin.—These non-toxic powders are used for producing some local anæsthesia on mucous surfaces. They may be used to mitigate the discomfort after operations on the air-passages, in removal of tonsils, cauterization of the nose or pharynx, and are particularly useful in soothing the dysphagia of tubercular laryngitis or other diseases. It is doubtful if they will act through unbroken epithelium.

LOCAL ISCHÆMIA: SUPRARENAL-GLAND EXTRACT

The extract of the suprarenal gland is available under various names—adrenalin, adrenine, adrin, perinephrin, epinephrin, hæmostasine, hemesine, vaso-constrictine, suprarenalin, suprarenin, epirenin, paranephrin, adnephrin, renaglandin, renostypticin, etc. These liquids are generally of the strength of 1 in 1,000, and can be used pure on mucous surfaces. But they can be diluted with normal saline solution, solutions of cocaine, or other drugs. If kept in well-stoppered tinted glass bottles, the solution can be preserved for at least several weeks. The solid extract is useful for those who only occasionally employ it, and in this form it is conveniently made up with cocaine or eucaine, so that solutions of the desired strength are prepared as required.

Applied to a mucous surface, adrenalin produces a local ischæmia by contracting the blood-vessels, so that the surface becomes pale

* *Brit. Med. Journ.*, 1906.

† J. W. Pare, *Brit. Med. Journ.*, May 18, 1907.

CHAPTER IV

SPECIAL CONDITIONS AND DANGERS OF OPERATIONS

IN the performance and after-treatment of operations on the nose and throat, there are special conditions and dangers to be considered and guarded against. These are increased when a general anæsthetic is required. This is administered through the one, narrow, natural orifice in which the operator has to work, while at the same time it is kept clear of blood and mucus for the patient to breathe, swallow, and possibly vomit.

Bleeding cannot be controlled as easily and directly as in the operations of general surgery, and there is always the risk of blood passing into the lower air-passages. The field of operation can never be rendered sterile, and in many cases is particularly septic. Wounds through the mucous membrane cannot be protected with dressings in the usual way; so that the local methods of repair require particular study. Shock has certain features to be borne in mind, and certain possibilities of septic infection have to be provided for. These several points will now be considered more fully.

Hæmorrhage.—This is apt not only to be more free, but also more serious, in young children and in patients over 60. The tendency is increased with menstruation or pregnancy, while hæmophilia adds a grave danger.

In the nose, the vascular turbinals bleed freely; a small varicose vessel on the septum is the commonest source of epistaxis—often very copious; vascular growths are met with, and malignant ones are apt to bleed profusely. Secondary hæmorrhage may occur between the third and eighth day after operation, when clots or crusts become detached.

In the naso-pharynx, where bleeding surfaces are still more remote, hæmorrhage from such growths as adenoid vegetations is generally very sharp, though of short duration, while from naso-pharyngeal fibromata it is apt to be copious and almost uncontrollable.

In the pharynx, the proximity of large vascular trunks, with

side, face downwards, and pinching both nostrils. If a galvano-cautery is available, and the bleeding comes from a limited and visible point, it can be sealed with a touch of the electrode (cf. p. 63).

If these methods fail, plugging must be resorted to. With the nasal speculum and good illumination, the bleeding area is cleansed with cocaine and adrenalin and a strip of one-inch ribbon gauze is carefully packed on to the spot, the end being left just within the vestibule, so that the patient can remove it for himself at the end of twelve or twenty-four hours. It is better to use a single strip of gauze, instead of cotton-wool, as portions of the latter might be detached and left behind. If there is fear of the gauze strip becoming adherent, it can be smeared with sterilized vaseline beforehand.

If the bleeding comes from far back in the nose, or from the postnasal space, it may become necessary to plug the latter cavity. A purified sponge, about the size of a small Tangerine orange, is squeezed very dry, compressed, and tied round its centre with a piece of tape, leaving two free ends of about twelve inches in length. A soft rubber catheter is passed along the floor of the nose till it appears below the soft palate, when the end is seized with forceps and drawn through the mouth. To this one of the tapes is made fast, so that when the catheter is withdrawn from the nose, the sponge is pulled up into the postnasal space. The two tapes are tied together over the upper lip. The anterior part of the nostril can then be packed with gauze, if necessary. If the patient is under chloroform, one tape can be dispensed with; the soft palate is simply held forwards with the forefinger of one hand, or a palate retractor, while the other hand passes the compressed sponge up into the naso-pharyngeal space.

Plugs in the nose should be avoided, if possible. They are painful, interfere with repair, prevent drainage, and may be followed by septic troubles in the nose, accessory sinuses, middle ear, or cranial cavity. Bleeding often recurs on their removal. In any case they should not be left unchanged for more than twenty-four or, at the most, forty-eight hours. Removal is facilitated by soaking them well with liquid paraffin or peroxide of hydrogen, and detaching them slowly and gently.

In the **naso-pharynx**, plugging, except as a temporary measure while the patient is under a general anæsthetic, should only be had recourse to when the measures first described have failed. It is extremely painful, and is apt to lead to acute septic otitis media.

Bleeding in the **pharynx** is met by rest, cold affusions to the

copious, may produce immediate asphyxia ; or, if less abundant, may cause septic pneumonia. When it occurs, the anæsthesia should be stopped, and the patient rolled well over on to his face or inverted, until the breathing in the trachea is cleared. At the conclusion of all nose and throat operations it is a wise precaution to keep the patient on his side, the head on a low pillow, and the face downwards, while the body is arranged in the gynæcological position. He should occasionally change from one side to the other, so that gravity may assist the exit of blood and mucus from each bronchus.

Shock, particularly in operations on the nose, is apt to be marked in young children and in elderly persons. It is for this reason that we try to avoid the removal of adenoids in patients under three years of age, or of polypi in those over sixty ; and that in all cases we endeavour to operate as rapidly as possible. Removal of part or all of the larynx sometimes causes marked shock.*

This possibility of shock is guarded against and treated in the usual way. The use of cocaine and adrenalin, even in patients under a general anæsthetic, helps to avoid it,† and anæsthesia should never be too deep or prolonged. When operating under local anæsthesia it is sometimes wiser not to attempt too much at one sitting, e.g. to treat only one side of the nose at a time. In other conditions, and when a general anæsthetic is employed, it may be safer to try to complete treatment at one operation.

Sepsis and other complications.—Some of these possibilities have been mentioned when describing the use of the galvano-cautery, and others will be referred to subsequently. Deaths have been recorded after the simple use of the galvano-cautery or the removal of nasal polypi, and of course are more to be feared after major operations, such as the radical cure of sinus suppurations or extensive proceedings in the pharynx or larynx. These accidents may be due to direct septic infection, or to thrombosis.‡ The orbit may be invaded in operations on the ethmoid, the external muscles of the eye may be injured in the frontal sinus

* Chevalier Jackson, *Journ. of Laryngol.*, xxi., 1906, p. 632.

† G. W. Crile, *Journ. Amer. Med. Assoc.*, June 17, 1905.

‡ J. Merckx, *Ann. des Mal. de l'Oreille*, 1906, ii., p. 199. (Meningitis simply from removal of a polypus from the middle turbinal ; but the patient had double ethmoid and frontal suppuration of many years' standing.)

Broeckaert, *Ann. des Mal. de l'Oreille*, Déc., 1894. (Death after removal of polypus with the galvano-cautery ; but the autopsy showed multisinusitis.)

H. P. Mosher, *Journ. of Laryngol.*, 1907, p. 363. (Fatal meningitis after removal of anterior end of middle turbinal ; but foul pus was present in many of the accessory cavities.)

G. L. Tobey, jun., *Journ. of Laryngol.*, July, 1907, p. 363. (An analogous case.)
Grünwald, *Centralbl. f. Ohrenheilk.*, Aug., 1908.

insignificant operation in the nose and throat. In some cases the symptoms may be referable to the toxic effect of the cocaine (cf. p. 66). Semon has recorded the case of a man, aged 39, in whom exophthalmos with symptoms of Graves' disease (Gräfe's sign, Stellwag's symptoms, rapid pulse), and later on complete premature baldness, followed on repeated operations with snare and galvano-cautery for removal of recurrent nasal polypi.* Charsley has observed marked enlargement of the glands of the neck, protrusion of the eyeballs, and pulse-rate of 110 lasting for three months, after treatment of the turbinals with galvano-cautery.† Cresswell Baber mentions the case of a man in whom removal of polypi with the cold snare was followed by diplopia.‡ In this latter case the symptoms disappeared under the administration of perchloride of mercury and iodide of potassium, and numerous growths were subsequently removed without any return of the ocular disturbance. This observation indicates that many sequelæ which may be ascribed to nasal operations are due to entirely different causes, and that, at the most, the operation may only have a determining influence.

Asepsis. After-treatment.—As already remarked, the field of operation can never be rendered completely sterile.

In the nose, when there is no suppuration, it is safer to make no attempt to purify the cavity beyond cleansing the vibrissæ and vestibules (cf. p. 7). The Schneiderian membrane will not tolerate any antiseptic lotion of such a strength as to be effective, and weaker solutions only interfere with the action of the cilia, the protective power of the mucus, and other defensive arrangements of the nose. If pus, scabs, or foreign bodies exist in the nose, it should be well washed with a simple, tepid, alkaline solution (Formulæ 8 to 11). When operating on the pharynx and larynx it is well to see that the teeth and gums are rendered as clean as possible by free use of a tooth-brush and suitable mouth-wash, and, in some cases, by a visit to the dentist.

But every care should be taken to purify the surgeon's hands, sterilize all instruments, and see that no contamination takes place during the operation. This is assisted by having the patient's head surrounded by a sterilized towel, and his face, moustache, and beard well washed, for the surgeon's hands and instruments come in frequent contact with these parts. Contamination from the hands or instruments of the anæsthetist must be guarded against.

After all intranasal operations, everything should be avoided which interferes with the drainage, ventilation, and natural repair

* *Proc. Laryngol. Soc., London*, i., 1893, p. 41.

† *Ibid.*

‡ *Ibid.*

PART II.—DISEASES OF THE NOSE

CHAPTER V

SYMPTOMS OF NASAL DISEASE

DISEASES of the nose and naso-pharynx may manifest themselves by local and also by more remote symptoms. These symptoms, both local and remote, may be considered under six headings :—

1. Symptoms in the upper air-passages, produced by—
 - (a) Diminished nasal respiration.
 - (b) Reflex effects.
 - (c) Descending infections of the air-passages.
2. Digestive troubles, due to—
 - (a) Mouth-breathing.
 - (b) Swallowed septic matter.
3. General and developmental troubles—
 - (a) Insufficient respiration, and consequent inadequate hæmatisation.
 - (b) Exaggerated efforts of inspiration, and consequent deformities of chest and spine, in childhood.
 - (c) Chronic auto-toxæmia.
4. Cerebral affections, consequent on—
 - (a) Intimate connexions between the vascular and lymphatic circulations in the nose and brain.
 - (b) The immediate anatomical relationship of the nasal fossæ and accessory sinuses to the brain.
5. Affections of the ear and the eye.
6. External affections of the nose—congestion, thickening, eczema, acne rosacea, erysipelas.

NASAL OBSTRUCTION. MOUTH-BREATHING

One of the most frequent and most important consequences of nasal disease is obstruction to respiration. The harmfulness of the mouth-breathing entailed in marked cases is now generally accepted; but as obstruction is a factor in numerous nasal affections, and as many of its possible consequences are not

Symptoms of nasal obstruction:—

Difficulty in clearing the nose of mucus.

Noisy nasal respiration, with sniffing, heavy breathing, and snoring.

Loss of nasal resonance and alteration of voice.

Anosmia.

Deformity of the chest-walls.

Deficient aeration of the blood, particularly at night, tending to—

Restless sleep ; night-terrors ; laryngeal spasm ; laryngismus stridulus ; cyanosis ; night-sweats ; with occasional attacks of so-called "false croup."

Morning headache ; peevishness ; anorexia with pharyngeal and gastric catarrh.*

Mouth-breathing, associated with—

Typical facies.

Dry mouth.

Spongy gums.

Dental caries and tartar.†

Slowness in eating, or necessity of bolting imperfectly masticated food.

Recurring tonsillitis and pharyngitis.

Laryngitis sicca and laryngeal catarrh.

Bronchitis and pulmonary affections.‡

Deficient expansion of chest.

Gastric catarrh.

Increased tendency to contract measles, diphtheria, or scarlatina.

General symptoms:—

Impaired sense of well-being ; lassitude.

Muscular weakness ; tendency to lateral curvature.

Breathlessness on exertion ; patient feels no inclination to sing or whistle.

Malnutrition ; anæmia ;§ arrested growth.

* L. H. Pegler, "Headache in association with Obstruction in the Nasal Passages," *Brit. Med. Journ.*, 1910, ii., Nov. 26, p. 1701.

† Guye, *Journ. of Laryngol.*, July, 1895.

T. Manciola, *Arch. Internat. de Laryngol.*, xviii., 1904, No. 4, p. 141.

‡ Moeller and Rappoport, *Zeitschr. f. Tub. u. Heilst.*, July, 1903 ; and Epitome in *Brit. Med. Journ.*, Jan. 9, 1904.

W. C. Rivers, "The Comparative Frequency of Impaired Nasal Respiration as an Antecedent to Pulmonary and Extra-Pulmonary Tuberculosis," *Brit. Med. Journ.*, June 16 and Dec. 1, 1906.

W. Freudenthal, "On the Etiology of Pulmonary Tuberculosis in relation to Diseases of the Nose and Throat," *N.Y. Med. Journ.*, Dec. 19, 1903.

§ For alteration in blood, see under Adenoids, p. 301

but if the lips are kept closed they seem to have lost the faculty of making use of the nasal thoroughfare, and become blue from asphyxia.* In some of the cases the patient talks with the "dead voice" of the adenoid subject.

This condition is generally met with in hysterical persons; it is somewhat analogous to functional aphonia, and should be treated on the same principles.

A more common condition is that in which, after the removal of long-standing obstruction, the patient is found to have partly lost the instinct of nasal respiration, and continues to be a mouth-breather. In such cases it is often suggested that the obstruction has been incompletely removed or has recurred, when the simple fact is that the patient has to be re-educated in the use of the now unobstructed nasal thoroughfare. This is often attempted by tying up the chin, as in a bandage for broken jaw, but it is more pleasantly effected by training the child with respiratory exercises, and encouraging the playing of various games, such as skipping, rolling a hoop, and dancing, while keeping the mouth firmly closed.†

* M. Lermoyez, Soc. Méd. des Hôp. de Paris, séance du 20 Jan., 1899.

M. Lermoyez. *Presse Méd.*, 2 Juillet, 1904, p. 420.

L. H. Pegler, *Journ. of Laryngol.*, July, 1902.

† Alice R. James, "Ball Games and Breathing Exercises." London, 1908.

Percy Lewis, M.D., "A Manual of Medical Exercises," 2nd ed. London, 1910.

to manifest itself first in the postnasal space, whence it spreads forwards to the nose and downwards to the pharynx and larynx. It may begin in the pharynx and extend along the same routes. More rarely it originates in the larynx, when it is not so apt to invade the upper cavities, although it is still likely to spread to the lower air-tubes. The point of origin, the direction of spread, and the intensity of symptoms doubtless depend on local predisposition, which also explains the subsequent persistence of chronic trouble in any of the regions invaded.

Apart from local manifestations—to be considered in later chapters—the onset of a cold is often indicated by a feeling of chilliness. This is frequently referred to the neck, shoulders, back, or legs, and is looked upon as the direct result of exposure to cold, whereas it is only one of the developing symptoms, like headache, sore throat, or cough, of the already contracted disease. The chill may be so slight as to escape notice, or may amount to a shiver or rigor. Malaise, depression, listlessness, and prostration are frequent, although in some cases patients feel brighter with the efflorescence of symptoms. Appetite may be absent or capricious. Digestion is generally interfered with. The patient feels feverish, although the temperature may be but slightly raised.

The course of the disease will vary with its intensity, the general resistance of the individual, local predisposition, the surroundings of the patient, and the treatment employed. A popular saying has it that a cold is three days coming, three days staying, and three days going ; while a French authority satirically remarks that “*un rhume non traité dure deux semaines, traité il ne durerait que quinze jours.*”

Varieties.—Confusion as to the causation of a “cold” has partly originated from the fact that numerous diseases of the air-passages, manifesting themselves chiefly by catarrh, have formerly been grouped together. Thus the vaso-motor turgescence of the mucous membrane of the nose may originate in certain individuals from some reflex, such as a chilling of the feet, sudden exposure to bright light or damp air, inhalation of vitiated air, gastric disorder, or sexual irritation ; but this cannot be regarded as coming in the same category with the symptoms at present under consideration. Hay-fever and paroxysmal sneezing must be differentiated. Infections of the pharyngeal or palatine tonsils, misuse of the voice, the irritation of tobacco or alcohol, are examples of what may result in “catarrh,” but must be distinguished from what is called “taking cold,” just as the rhinitis of measles, or the laryngeal catarrh of a phthisical subject, has a different causation. The study of diseases in the accessory sinuses of the nose

very apt to be attacked on landing in inhabited though warmer latitudes.

Predisposing causes.—Certain families show a tendency to contract catarrhal fevers, but this is more likely to be due to a family likeness as regards the air-passages than to a marked general susceptibility. Any local defect with the normal respiratory functions of the nose and throat weakens the defensive arrangements and favours invasion (cf. p. 5). The local as well as the general resistance is enfeebled by vitiated or contaminated air. Insanitary dwellings, hot, crowded, and dust-laden rooms or vehicles not only lower this resistance, but expose the individual to direct and close contamination. Everything which depresses the general condition—repletion, fatigue, hunger, mental depression, anxiety—favours invasion. It is in this same way that cold acts as a predisposing cause, just as heat and damp lessen resistance. Thus, on immersing a hen in cold water, it loses its resistance to anthrax. Frogs, on the other hand, early succumb to anthrax if kept warm at a temperature of 25° to 35° C.

Disorders of the digestive tract, certain constitutional diseases (diabetes, syphilis, tubercle), faulty metabolism, excesses of all kinds, in fact, anything which lowers the general resistance of the body, will predispose to local catarrhal infection. Gout and rheumatism are often blamed as predisposing causes. Dust, alcohol, and tobacco are potent factors, and sexual excesses conduce to it.

Bacteriology.—A specific organism of catarrhal infection has not been definitely isolated. Remembering the practically aseptic condition of the normal nasal mucous membrane (p. 7), it is possible that one specific organism will not be discovered, and it may be found that the natural defences of the nose are, under certain inimical conditions, overborne by the incursion of a diversity of organisms. The *Bacillus coryzæ segmentosus* (= *B. septus*),* the *Micrococcus catarrhalis*,† the *Diplococcus coryzæ* ‡ (Hajek), the bacillus of Friedländer,§ pseudo-diphtheritic bacilli,|| and other organisms have been found associated with nasal catarrh.

According to R. W. Allen, at least five organisms are capable of producing the symptoms of a common cold, viz. (i) *Bacillus*

* E. Cautley, 24th Ann. Rep. of the Local Govt. Board, 1894-95, p. 455.

† C. H. Benham, *Brit. Med. Journ.*, May 5, 1906.

R. Pfeiffer, quoted in article by Neisser in Kolle and Wassermann's "Pathologische Micro-organismen," ii., 1903, p. 146.

‡ Hajek, *Berlin. klin. Woch.*, 1885, No. 33.

§ R. W. Allen, *Brit. Med. Journ.*, May 12, 1906, p. 1131.

|| Neumann, *Zeit. f. Hyg.*, Bd. xl., 1902, Heft 1, p. 33; and *Brit. Med. Journ.* (Epitome), Oct. 25, 1902.

existence is passed. Not only is unvitiated air important as being the natural atmosphere of the air-passages, and for its own vitalizing effect in respiration, but because of its stimulating action on the skin. The healthy action of the latter should be maintained by baths and exercise, and by wearing simply a sufficiency of clothing. Warm baths—even hot, as in Japan—by their cleansing and stimulating action on the skin probably harden a patient more against catarrh (particularly if followed by a brisk rub down, a cold douche, or some physical exercises) than jumping in and out, uncleansed, from a cold tub. Open-air games and sports are better than any formal indoor exercises. An hour's walk is better, particularly for elderly subjects, than half an hour of dull, mechanical "movements" in a stuffy and dusty gymnasium. When open-air exercise is not available, it must be replaced or reinforced by fencing, boxing, or some physical-culture exercises. Clothing must be regulated according to the atmospheric conditions, the age, health, vigour, and occupation of the patient. Too much clothing predisposes to catarrh as much as too little. The skin can, by training, be rendered less sensitive, and the depressing effect of external cold by reflex action can thus be avoided. When sitting still, or exposed to chilling winds, covering is often not sufficiently increased, while people are very apt to take active exercise unduly loaded. Sitting in wet clothing is not so depressing as sitting with soaked boots.

Children are often sent out with their necks stifled in mufflers, the head stuffy in a woollen cap, and the legs weighted with heavy gaiters. These are parts of the body which least require protection; and children may be seen flushed and fatigued at their games, when it is only the heat and weight of unnecessary clothes which tire them. The hands and knees are frequently left exposed to depressing cold, and the unnecessary jacket in which they are wrapped up would be much more useful if put on when their games or exercises are over and they are "cooling down."

Flannel, or wool in some form, is not a suitable material for wearing next the skin. Flannel is recommended because, by reason of the air-spaces it contains, it is a bad conductor of heat. But the objection to it is that it is not absorbent, and when worn next the skin it imprisons the moisture, and thus gives rise to deficient evaporation, diminished metabolism, and great disinclination to mental and bodily exertion.* Silk, linen, and cotton are preferable as underwear; they are all highly absorbent; are now manufactured in such a way as to contain air-spaces ("linen-mesh"), and this makes them efficient non-conductors of heat. Air being

* Leonard Williams, "Minor Maladies." London, 1906.

late of soda, or salophen. Neuralgic pains may call for phenacetin or other nerve-sedatives. In the early stages the secretion of mucus may be promoted by ipecacuanha, antimony, or small doses of iodide of potassium (Formula 52). The outpouring of mucus is the best protection in early stages to an inflamed membrane, and attempts to check it by giving belladonna or other antiscarrhal remedies are unphysiological, frequently useless, and often distressing to the patient. Later on, with much secretion in the larynx and trachea, expectorants may be indicated (Formula 55).

When the acute stage is past, quinine, iron, arsenic, and similar tonics are useful; and change of air is often beneficial. The after-effects will be treated symptomatically. The local measures of relief for rhinitis, sore throat, or laryngitis will be referred to under their separate headings.

Those who think it possible to abort a catarrh are in the habit of ordering 10 to 20 gr. of pulv. ipecac. comp. at bedtime; or liquor opii sedativus in a dose of 20 drops at bedtime, or 5 drops every hour for three doses. Burney Yeo gives the following draught at bedtime:—

R	Tinct. opii	.	.	.	.	℥x
	Vini ipecac.	.	.	.	.	℥v
	Spirit. eth. nit.	.	.	.	.	ʒi
	Liq. ammon. acet.	.	.	.	.	ʒiii
	Aq. camph. ad	.	.	.	.	ʒi

Some practitioners pin their faith to repeated small doses of tincture of aconite or spirits of camphor, while others prescribe $\frac{1}{20}$ gr. of pilocarpine every three hours.

Belladonna is much used with the same object in the form of the following tablet:—

R	Ext. belladonnæ	.	.	.	.	gr. $\frac{1}{8}$
	Camphor	.	.	.	.	gr. $\frac{1}{4}$
	Quininæ sulph.	.	.	.	.	gr. $\frac{1}{4}$ —i

One every hour.

Atropine is sometimes applied to the nasal mucous membrane as soon as the earliest symptoms are perceived.

R	Atropinæ sulph.	.	.	.	.	0·10
	Aq. laurocerasi	.	.	.	.	20·00
	Aquæ	.	.	.	.	20·00

This is employed as a spray or paint every half-hour or hour, but not oftener than eight to ten times a day. It is only advised for early cases, and before obstruction occurs.*

* Boulai, *La Clinique*, 6 Sept., 1907. (Ref. in *Brit. Med. Journ.*, Epitome, Dec. 21, 1907.)

CHAPTER VII

EPISTAXIS. INJURIES. DISEASES OF THE VESTIBULE. CONGENITAL OCCLUSION OF THE NOSTRILS

EPISTAXIS

Synonym.—*Nose-bleeding.*

Bleeding from the nose should be regarded as a symptom. In a few rare instances it may occur as a physiological process; more commonly it is caused by general conditions; but in the majority of cases it is due to a local vascular condition. In some instances local and general causes are combined.

Local causes:—

Traumatism : blows, falls, surgical treatment.

Traumatic abrasion, ulceration, or perforation (p. 142).

Multiple telangiectases.*

Rhinitis sicca (p. 128), and atrophic rhinitis (p. 129) from separation of crusts.

Adenoid growths.

New growths in the nose, innocent, like bleeding polypus and naso-pharyngeal fibromata; or malignant.

Syphilis.

Rarer local causes are—

Leprosy.

Foreign bodies, leeches, worms, and maggots.

* W. Osler, *Bull. of the Johns Hopkins Hosp.*, Nov., 1901, p. 333.

Rendu, *Gaz. des Hôp.*, 1896, No. 135, p. 1322.

W. Legg, *Lancet*, ii., 1876, p. 856.

O. Chiari, "Erfahrungen aus dem Gebiete der Hals- und Nasenkrankheiten," S. 60. Wien, 1887.

C. O. Hawthorne, *Lancet*, 1906, i., p. 90.

A. Brown Kelly, *Glasgow Med. Journ.*, June, 1906.

F. Parkes Weber, *Proc. Roy. Soc. of Med.*, Laryngol. Section, Feb. 7, 1908, p. 43.

F. Semon, *ibid.*, p. 44.

A. Brown Kelly, *ibid.*, p. 44.

E. B. Waggett, *ibid.*, March 6, 1908, p. 70.

Lambert Lack, *ibid.*, March, 1909, p. 107.

K. Hoffer, *Wien. klin. Woch.*, xxi., 16 April, 1908, No. 16, S. 570.

Voigt, *Zeits. f. Laryngol.*, Bd. i., 1908, Heft 1, S. 19.

Frederick Hanes, *Bull. of the Johns Hopkins Hosp.*, March, 1909.

away by the flow of blood, and fill the nose with dirty coagula which obscure the field of operation and mask the actual state of affairs. Bellocq's sound is uncalled for, and tight plugging of the anterior nares is painful and often useless.

In all cases the patient should be kept lying down, as cool as possible, with no heavy or tight clothing, and not alarmed. If he lies over on his side, pinches the end of the nose with his own thumb and forefinger, and keeps the nostrils closed for fifteen minutes by the clock, the majority of cases of epistaxis will be arrested without further interference, thanks to the formation of clot, and the direct pressure on the epistaxis area. If this fails, the nose should be cleared of clot by sniffing up warm salt-and-water (3i to Oi) at a temperature of 112° F., while cold water is freely sluiced over the face and neck. If ice is available it is added to the cold affusion, and portions are held in the mouth. Or cotton-wool soaked in lemon-juice, hazeline (Pond's extract), or a solution of antipyrin (gr. xxx to ʒss) can be introduced into the bleeding nostril, which is then compressed with the patient's forefinger for fifteen minutes. These remedies are generally at hand, and can be used without any special instruments. If adrenalin or peroxide of hydrogen is available, either of them is still more effective. These steps will be successful in the majority of cases; and the cotton pledget may be left for twenty-four hours, when the treatment against recurrence can be carried out.

If the bleeding persists, as it is only apt to do when it does not arise from the epistaxis area, the practitioner must provide himself with good illumination, a nasal speculum, and some 1-inch-wide ribbon gauze. After applying 5 per cent. cocaine, he carefully packs the nose from the floor upwards and from behind forwards. The gauze should be removed within twenty-four hours. If the bleeding is profuse the gauze is squeezed out of a 10-volume solution of hydrogen peroxide.

The above measures are suggested for cases in which special instruments are not available.

Curative and preventive local treatment.—The following measures should be carried out in the first instance, if the necessary armamentarium is available. The bleeding point having been defined and arrested by a pledget squeezed out of equal parts of adrenalin and 10 per cent. cocaine, the galvano-cautery at a cherry-red heat is applied, and the bleeding point sealed up (*see* p. 62). If this instrument is not available, a silver probe is heated in a spirit-lamp to a dull red, and used in the same way. Failing these, the point of a stick of nitrate of silver, or some chromic acid, trichloroacetic acid or pure carbolic acid will prove nearly as effective.

It may be partial or complete, and unilateral * or bilateral.† These cases do not, as a rule, lend much support to the frequently quoted experiment of Ziem, in which occlusion of the nasal passage in young animals led to septal deviation, deformity of the palate, crowding of the teeth, and defective development of the superior maxilla.

Operation.—If the web obstructing the nostril is thin and membranous, and of low vitality, a simple and effective method is to destroy it with the galvano-cautery. It is best to spread the treatment over several sittings, so as to diminish the local reaction. The application of cocaine may not be sufficient to numb the pain, as the tissue of the obstructing web is more allied to skin than to mucous membrane. It should therefore be punctured quickly in two or three places with a sharp cautery-point, raised to nearly a white heat. If the patient is nervous it may be well to administer nitrous-oxide gas. The orifice is kept distended, until healing takes place, by wearing a Meyer's vulcanite tube (Fig. 82), or short lengths of full-sized rubber drainage-tube, or nasal dilators (Figs. 60 and 61, p. 108), well smeared with boric, aristol, zinc, or similar ointment. The nasal dilator is changed once or twice daily, and the nostril well cleansed on each occasion.

If the web obstructing the anterior naris is more fleshy in character—and it is more apt to be of this nature when it is incomplete—it is necessary to remove it with a knife. So as to leave as much epithelial tissue as possible, and avoid retraction, the operation is done as follows, under local or general anæsthesia: A narrow, sharp-pointed knife, such as a Graefe or other ophthalmic scalpel, is used to puncture the obstructing web from before backwards, and it is then made to sweep round the obstructing web, while gradually cutting its way towards the central lumen. The tongue of skin thus formed can be used as a graft to cover most of the raw surface.

The restored anterior aperture is kept patent, as already described, till healing takes place.

In some cases the following operation has been shown to be easy and effective. An incision is made at the junction of the web with the septum, keeping close to the latter and passing straight down to the floor of the nose. On the outer side a similar incision is made, but sloping somewhat outwards. The flap formed between these two incisions is not cut off, but is bent backwards and fastened to the floor of the nose by a single horseshair stitch.‡

* P. Watson Williams, *Proc. Laryngol. Soc., London.* iv., Dec., 1896, p. 32.

† A. H. Cheate, *ibid.*, ix., April, 1902, p. 98.

‡ G. K. Grimmer, *Proc. Royal Soc. Med., Laryngol. Section*, April, 1908.

down thoroughly with a Krause trocar (Fig. 124*a*), an antrum drill (Fig. 119), an electric dental burr, a nasal punch forceps, or a chisel and hammer. With a short pair of adenoid forceps (Fig. 170) a small piece should then be nipped out of the posterior margin of the septum. A simple alkaline nose lotion is, usually, the only after-treatment required; but the posterior nares should be inspected regularly for some months, and any tendency to closure can be met with gauze plugging or by clipping the edges of the choana with sphenoidal punch forceps (Fig. 146, p. 280).

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Fig. 1.—Papillary hypertrophy of the posterior extremities of the inferior turbinals, as seen in the postnasal mirror. (See p. 120.)

Fig. 2.—Choanal or postnasal polypus, as seen by posterior rhinoscopy in the left choana. (See p. 318.)

Fig. 3.—Crusting, atrophic catarrh, as seen by posterior rhinoscopy in the postnasal space, and, as a matter of fact, due to suppuration in the right sphenoidal sinus. (See pp. 330 and 276.)

(From Grünwald's "Atlas and Epitome of Diseases of the Mouth, Pharynx, and Nose.")

PLATE II.

followed by a sense of stuffiness in the nose, sneezing, lachrymation, and a discharge which is at first watery and acrid, and later on mucopurulent. The nasal chambers become more or less completely obstructed, and this induces headache, anosmia, impairment of that part of taste which depends on the olfactory nerve, mouth-breathing, and secondary pharyngitis and laryngitis. The discomfort of the obstructed nose and dry mouth always becomes much worse at night, and may render sleep broken and unrefreshing, while children who have not acquired the habit of mouth-breathing will even struggle for breath and suffer from attacks of laryngismus stridulus (cf. pp. 296 and 470). There is often a sense of stuffiness in the ears, with some deafness and occasional tinnitus. By losing its chief resonating chamber the voice assumes a so-called "nasal" tone. The temperature may be slightly raised.

On inspection, the upper lip is often found excoriated by the acrid discharges, the alæ nasi are red and thickened, and the conjunctivæ are seen to be injected. The mucous membrane of the nasal cavities is of a dark red colour, and the inferior turbinals are so swollen as to occlude the nasal passages. When touched with a probe their surface is found to be elastic, and can be indented like an air-cushion, but the depression formed at once fills up again. When mopped with a 5 per cent. solution of cocaine the engorged tissues retract, and a deeper view can be obtained. This restoration of the nasal air-way is only temporary, and is followed by a more marked turgescence. It is of value, however, as the more complete inspection helps in confirming the diagnosis. The discharge will vary in quality and amount according to the stage of the attack.

Complications.—Examination will generally reveal an inflamed condition of the postnasal space, and it is not uncommon for the catarrh, in a mitigated if not acute form, to extend to the lachrymal sac, the pharynx, larynx, and trachea. Any of the accessory sinuses of the nose may become infected, and extension may take place through the Eustachian tube to the middle ear. These latter complications are particularly apt to occur when the acute rhinitis is associated with influenza.

Complete nasal obstruction in nursing infants may constitute a serious condition, so greatly will it interfere with suction. This must be replaced by spoon-feeding.

Pathological anatomy.—The epithelium shows but slight modifications; the cilia may be absent, and in some spots the superficial stratum may be missing. In the substrata there is intense cellular infiltration.*

* Seifert, *Münch. med. Woch.*, June, 1904.

SIMPLE CHRONIC RHINITIS

Synonyms.—*Chronic coryza*; *chronic catarrh*.

Definition.—A chronic catarrhal condition of the nose.

Although one of the most common of nasal affections, the definition of chronic rhinitis is uncertain and vague, including, as it may do, anything from the remains of an acute coryza up to an established hypertrophic rhinitis.

Chronic rhinitis will usually disappear with the removal of the cause, but may persist until hypertrophic changes have taken place in the nasal mucosa. It is generally a secondary affection, associated with some constitutional condition, or some nasal obstruction, or a pyogenic process in the accessory sinuses or postnasal space.

Pathology.—There is engorgement of the vessels with commencing inflammatory changes in the mucosa. The condition is not infective. The rôle played by micro-organisms is not well determined. In the simplest form of chronic rhinitis ordinary staphylococci, not virulent, are found in the anterior segment of the nose. If the secretion is irritating, producing sycosis, virulent *Staphylococcus aureus* is met with.*

Etiology.—Chronic rhinitis may be the legacy of an acute attack, or of a succession of mild attacks of coryza, or may be left after measles, scarlatina, or other specific infection. It is frequently met with in those exposed to dusty occupations—stonemasons, millers, furriers, tobacco-workers, or upholsterers. Chronic rhinitis forms part of the symptom-complex of any chronic affection of the nose, postnasal space, or accessory sinuses. The most common cause in childhood is inflamed adenoids, while in adults sinus suppuration is often overlooked as the etiological factor. Among the predisposing causes are those enumerated under the heading of catarrh (p. 91). Any deformity of the nasal chamber may conduce to the affection, particularly marked deviation or spurs of the septum. It is twice as common in men as in women, and it is more common in children than in adults. It is rare in old age.

Symptoms.—The most prominent symptoms of this condition are obstruction, and nasal or postnasal catarrh. The obstruction is seldom so complete as in other forms of rhinitis. It is generally intermittent, being worse after meals, in certain conditions of weather, and at night. Indeed, while through the day the condition may be almost negligible, at night the nostrils become so obstructed that mouth-breathing with all its discomforts is necessary. Gravity appears to increase the trouble, the lower nostril being generally the worst. The obstruction may diminish under the influence of cold, a sudden entry into dry air, or the effects of emotion.

* E. Guérin, *Rev. Hebd. de Laryn.*, xxv., 1904, No. 36, p. 273.

Treatment.—(See Treatment of Catarrh, p. 97.) This should be both (a) general and (b) local.

(a) **General treatment.**—The avoidance of an unhealthy atmosphere, as with workers in cement factories, carpet warehouses, or tobacco manufactories, may be indicated, and the patient's habits in regard to alcohol, food, tobacco, air, and exercise may require regulating.

Mechanical hyperæmia may be maintained by disorders of the digestive tract, the heart, the liver, the uterus, or the kidneys. It has been suggested that a diminution of the amount of salt taken with food might decrease the saline nasal flux.*

Some general disease may be the first, and possibly the only, thing requiring attention, such as diabetes, albuminuria, a pre-tubercular condition, gout, or anæmia.

In treating neurotic subjects it is unwise to aggravate the attention they give to their nasal catarrh by unduly increasing local medication. General treatment—massage, hydrotherapy—will frequently prove of benefit, as well as some form of outdoor exercise. Bicycling is apt to induce mouth-breathing and increase the nasal catarrh, at least temporarily. It is in the case of neurotic subjects, or those whom it is desirable to wean from a habit of over-drugging their nose, that a visit to some health resort is often indicated. According to the nature of the case, we may have to recommend sulphur (Harrogate, Aix, Luchon, Cauterets), arsenical (Mont Dore, La Bourboule), saline (Ems, Royat, Vichy, Homburg, Carlsbad), or iron springs (Spa, Schwalbach, St. Moritz).

(b) **Local treatment.**—It is important to individualize our treatment in all nasal affections, but particularly so in chronic rhinitis. Sometimes no local treatment at all is required.

The first thing to do is to see that the nose is satisfactorily and regularly cleansed (p. 51). All sniffing or hawking should be interdicted, and violent use of the handkerchief must be avoided as it only increases the local congestion. If the nasal thoroughfare is so obstructed by swelling or tenacious mucus that it is impossible to clear it, we must facilitate matters by the use of some cleansing lotion (p. 52), and the application of a suitable pomade to the nostrils (p. 57). Such simple measures, with attention to the matters mentioned in Chap. VI. (p. 95), will generally be sufficient to cure most ordinary cases. Further help may sometimes be obtained by the use of oily sprays after the mucus has been removed (p. 56). Where a condition of vaso-paresis appears to have been induced, benefit might be obtained by vibratory massage. But the use of astringents, such as zinc and alum, should

* L. Jacquet, *Ann. des Mal. de l'Oreille*, xxx., 1904, p. 193.

the root of an apparently obstinate catarrh. This is apt to escape detection when not associated with pus or visible polypi. It will be described later.

(As hypertrophic rhinitis is often found associated with chronic rhinitis, the following section should be consulted at the same time.)

HYPERTROPHIC RHINITIS

Definition.—Chronic nasal catarrh, characterized by thickening of the mucous membrane.

Etiology.—This condition is more frequently met with in men than in women. It is produced by the same causes as acute and chronic rhinitis. Any chronic obstruction of the nasal air-way, such as that caused by deviations, spurs, adenoids, and congenitally narrow nasal chambers, leads to hypertrophy of the mucous membrane. When one side of the nose is much wider than the other, compensatory hypertrophy usually develops in the middle and inferior turbinals of the roomy nostril. It is sometimes met with in the anæmic, but is then probably as often a cause as a consequence. It has been attributed to gout and rheumatism. It is frequently associated with a neurotic type, and is apt to be met with in those who are broken down in health, especially those who lead an indoor life. The Jewish race seems to be prone to it. It “runs in families,” often only in the male members, and is apt to be met with in those who have a family history of asthma, emphysema, and chronic bronchitis. Hypertrophy of the inferior turbinals, as well as of the uvula and fauces, is sometimes seen associated with myxœdema.*

Pathology.—The changes found are those of a chronic inflammatory process. The epithelial layers are increased, the upper ones becoming more cubical or flattened, and ciliated cells only remain in places. The vessels are dilated and thickened, and surrounded by a small-celled infiltration.† There is consequent increase of the interstitial tissue, and, as this seldom occurs uniformly, a polypoid formation takes place by which the surface is thrown into an irregular, papillary, rugose-shaped or polypoid condition.‡ This chiefly takes place on the inferior turbinal, the anterior extremity being sometimes so hypertrophied that it can be displaced by a probe (Fig. 64). Along the lower margin it is generally more diffused, but hypertrophied masses are often concealed under cover of its concavity (Fig. 65). The posterior extremity is also frequently affected. The smooth pinkish posterior extremity may develop a mulberry surface, and more or less completely occupy the lower half of the choana (Fig. 28). This condition has been studied by Wyatt Wingrave, who

* Connal, *Glasgow Med. Journ.*, Oct., 1898.

† Citelli, *Arch. f. Laryngol.*, Bd. xiii., Heft 1 (full abstract in *Laryngoscope*, xii., 1902, p. 720).

‡ L. H. Pegler, *Proc. Laryngol. Soc., London*, ii., 1895, p. 84.

hypertrophies of the posterior ends of the inferior turbinals, and of the choanal edge of the septum, generally present a dull-grey appearance in the postnasal mirror. (Plate II., Fig. 1.)

Symptoms.—The principal complaint is of nasal catarrh, the secretion being abundant, thick, sometimes muco-purulent, and occasionally stained with blood if much force has been used in expelling it. At times it may have a faint smell, or impart a slightly sickly odour to the breath. The other chief symptom is that of nasal obstruction, worse at night, and influenced by gravity, so that the lower nasal chamber in the lateral decubitus is the most obstructed. The obstruction may be sufficient to induce mouth-breathing with all its consequences (cf. Chap. v., p. 82). The sense of smell is diminished, and hence much of what is often attributed to taste is lost. The voice loses its nasal resonance and becomes thick and woolly. If the process affects the back of the nasal chambers, the discharge will tend to pass into the pharynx, and the symptoms will be chiefly those of postnasal catarrh. Hawking and hemming will then be more frequent, and an irritability will be produced which may excite vomiting. The catarrhal process is apt to spread to the Eustachian tubes, producing the symptoms of Eustachian collapse, and even catarrh in the middle ear. By direct spread, the inhalation of discharge, or the mouth-breathing induced, catarrhal symptoms may be found in the pharynx, larynx, trachea, and bronchi. Asthma or hay-fever is often associated with hypertrophic rhinitis. Disorders of the lachrymal tract and the eye, headache, many of the symptoms of aprosexia (p. 85), and various reflex symptoms, such as sneezing, coughing, sighing, neuralgia, asthma, aphonia, and laryngeal spasm, are at times attributable to it.

The acidity of the secretion may cause eczema of the nares, and some cases of congestion and thickening of the skin of the end of the nose are shown to depend on the state of the nasal mucosa.

Examination.—The nasal chambers should be inspected both by anterior and by posterior rhinoscopy. The nose should then be cleared, either by washing it out (p. 51) or simply by asking the patient to blow it; and, finally, the investigation is completed by the use of cocaine (p. 66), and exploration with the probe (p. 19). This plan enables us to detect the origin of a discharge within the nose, and to compare the condition of things before and after the use of cocaine. The first thing which meets the eye is the smooth, dull pink swelling of the anterior extremity of the inferior turbinal. The rest of the turbinal may show either a diffused or a circumscribed hypertrophy. The latter is common at the posterior ex-

produce reaction in the surrounding tissue and make it difficult to limit its area of action. Besides, extensive use of the galvano-cautery is never called for. When marked hypertrophy is present, as shown by the mulberry surface and the slight amount of retraction produced by cocaine, it is better to remove it by the cold-wire snare, scissors, or punch-forceps. These remove only redundant tissue of no physiological use, leave a clean wound, and produce less local reaction; hence there is not so much risk of adhesions or other complications.

The snare is often sufficient to embrace and remove large hypertrophied masses from the lower border of the inferior turbinal. The anterior end, when enlarged, should first be separated from

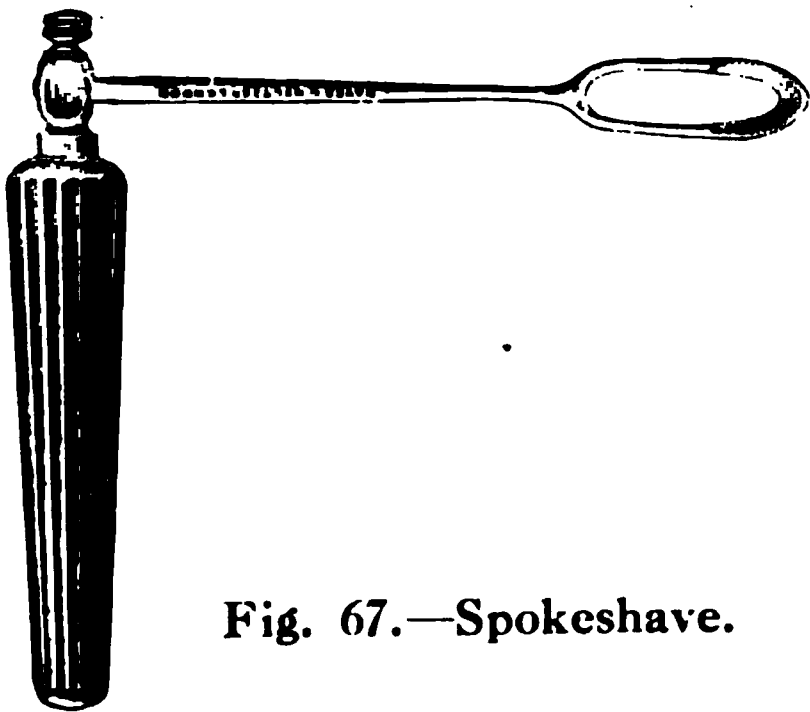


Fig. 67.—Spokeshave.

the outer wall by scissors (Fig. 64), and then cut away with the Krause, Blake, or Lack snare, threaded with No. 5 piano-wire. This proceeding will also give better access to polypoid masses tucked away in the concavity of the inferior turbinal. If the whole inferior border is affected (Fig. 67), it can be detached in one mass with nasal scissors or a spokeshave, but a pair of polypus

forceps should be at hand to seize and remove the growth when it remains attached posteriorly. The anterior end of the middle turbinal is removed in the same way (Figs. 68 and 69), but, as bone has generally to be included, it will frequently be found that the wire snare slips off the rounded head, which should then be seized and removed with Grünwald's or Luc's punch-forceps (Figs. 70 and 105).

Hypertrophies of the posterior end of the inferior turbinal require some skill to remove satisfactorily. Even with the nose carefully anæsthetized, the loop of spring wire is very disagreeable to the patient; the field of operation is not under direct inspection; and there is much difficulty in securing the wire noose around the soft, slippery hypertrophy. This can sometimes be effected by suitably preparing the wire loop beforehand. The operator introduces his left forefinger into the postnasal space, and there guides the wire loop around the hypertrophy, while the barrel of the snare is pressed down until the growth is gripped (Fig. 71). If the surgeon is deft, this somewhat disagreeable procedure can

patients, in spite of patent nostrils, there is an occasional tendency to limited recurrences, and a catarrhal condition may require the continued use of a simple nose lotion (Formula 8). The general and health-resort treatment mentioned in the preceding chapter may also be indicated in this condition (p. 118).

RHINITIS SICCA

Synonym.—*Dry rhinitis.*

Definition.—This is not a well-marked condition, although in various degrees it is not uncommonly met with. The nose may be congested, the turbinals chronically enlarged, and their smooth, glutinous surface patchy, with small, moist, dirty-black crusts, which are also scattered over the septum and middle meatus. In other cases the mucous membrane is pale and collapsed, adhering closely to the underlying turbinals, and leaving very roomy nasal chambers. Crusting is then less common.

Etiology.—The first type is met with in alcoholic, plethoric, adult males, and in factory workers of both sexes. The second, the collapsing turbinal form, is more common in anæmic females who suffer from constipation, dyspepsia, uterine disorders, want of air, or the usual causes of catarrh.

Symptoms.—Obstruction is the most common symptom in the first type of case, and irritation in the nose is common to both. But often the chief symptoms are referred to the usual sequelæ of nasal disease in the pharynx and larynx (*see* Symptoms of Nasal Disease, p. 82).

Examination.—In addition to the changes described, it will be noticed that the crusts are small and never offensive, and that they do not adhere very closely, although on the septum they may produce excoriation and epistaxis, and lead to perforation.

Diagnosis.—From ozæna the affection is distinguished by the absence of fetor, or atrophy of bone, and the preservation of the sense of smell. Any perforation must be distinguished from that of syphilis (*see* p. 614).

Treatment.—In the congestive type the avoidance of dust, alcohol, and tobacco is important. The nose must be cleansed and lubricated, as directed for hypertrophic rhinitis, and attention paid to dyspepsia and constipation (p. 123). The collapsing form met with in females may require some simple cleansing and soothing treatment directed to the nose and throat (*see* Chronic and Hypertrophic Rhinitis, pp. 118 and 123), but it is not well to concentrate the attention of these patients too much on the local condition. The condition of the pelvic organs is frequently at

(c) Bacterial and infective—

From laboratory results :

10. Cocco-bacillus (Löwenberg).
11. Bacillus mucosus (Abel).
12. Bacillus foetidus ozænæ (Hajek).
13. Pseudo-diphtheria bacillus (Bellfanti and Della Vedova).
14. Cocco-bacillus foetidus ozænæ (Perez).
15. Pes-Gradenigo bacillus.

From clinical observation (Massei, Perez, Lermoyez).

(d) Constitutional—

16. Syphilis.
17. Tuberculosis.
18. Atrophic neurosis (W. Williams, Zarniko, Réthi, Chauveau, Ferreri).
19. A toxic infection, particularly slow in progress, acting especially on the vessels and glands of the pituitary membrane, and possibly associated with tuberculosis.

The theory propounded by Bosworth regarded the ozæna as secondary to hypertrophic rhinitis, the long-continued muco-purulent discharge and the hypertrophy being succeeded by sclerotic fibrosis of both the mucous surface and turbinal structures.*

Adenoids are by far the most frequent cause of purulent rhinitis, and the observation that ozæna has become rarer since these growths have received recognition is claimed as supporting this view.

Increased roominess of the nasal chambers, with short noses and comparatively deep postnasal spaces, is met with in individuals with the brachycephalic type of skull. This type is met with in 50 per cent. of the cases of atrophic rhinitis. It is indicated externally by a wide face, broad, tip-tilted nose with open nostrils, and insignificant bridge. These wide, short fossæ would permit of the passage of an undue amount of air, and so might conduce to atrophy.

Suppuration in the accessory sinuses of the nose is certainly the true diagnosis in many cases. There are two difficulties in accepting this as the general cause. One is, that the sinuses are incompletely developed, and suppuration in them comparatively rare, at the age when atrophic rhinitis develops ; the other is that even when suppuration in the sinuses is found it is not easy to determine which of the two processes was the primary affection—if they are not simply coincident. On the other hand, there is little doubt that the more frequent recognition of sinus suppuration has greatly reduced the number of cases which formerly would have been diagnosed and treated as ozæna. Anyone revisiting a large throat clinic after an absence of some years must be struck with the comparative rareness of this once fairly frequent disease. And, again, suppuration in the frontal and maxillary sinuses seldom gives rise to symptoms of ozæna ; but it is not at all uncommon for pus in the sphenoidal and posterior ethmoidal cells to do so. Now, these cells are present at birth, and are close to the postnasal space, so frequently the seat of suppuration in early childhood.†

Bacteriology is unable to settle this question ; first, because many of the organisms separated may be met with in other conditions,

* "Diseases of the Nose and Throat," vol. i., p. 162.

Clement F. Theisen, *Laryngoscope*, xviii., 1908, No. 6, p. 417.

lying tissue is converted into dense connective tissue. The whole process is one of diffuse sclerosis, but this does not necessarily take place uniformly, and it is not infrequent to find hypertrophy and even polypi in the region of the middle turbinal, while there is marked atrophy of the inferior turbinal. Atrophy also attacks the bony structures, but particularly that of the inferior turbinal, so that the middle turbinal appears larger by contrast.

The secretion of this surface is, of course, very different from the normal. It is much less liquid, and instead of being clear, practically sterile mucus, it is thick with cellular detritus and teeming with micro-organisms. There are no cilia to wave the secretion towards the orifice, and in the widened nasal thoroughfares the expiratory blast of air acts with diminished force. Hence the secretion stagnates in the nose, putrefies, and, losing its moisture by evaporation, dries into adherent crusts. It is important to note that there is no necrosis of bone in this process, nor ulceration of the surface, although abrasion of the mucous membrane may occur from forcibly detaching the adherent crusts. The histology of the condition is thus summarized by Wyatt Wingrave: (1) Transformation of the columnar, ciliated, and special olfactory cells into stratified squamous epithelium; (2) disappearance of the hyaloid basement membrane; (3) the presence of special hyaloid bodies and pigment masses; (4) changes in the glands; (5) changes in the lymphoid tissue and blood-vessels; (6) changes in the bone.* There is marked absence of lymphoid tissue in the nose and naso-pharynx, and atrophy of the thyroid gland has been noted.

Symptoms.—The offensive smell from the nose is often the chief complaint. This odour is so penetrating that the affection in Germany is called "Stinknase," and in France "la punaisie." The smell, which, in women, is generally worse at the menstrual period, is sometimes, in early and less marked cases, perceptible to the sufferer, as her own olfactory sense may not be entirely destroyed. But, as a rule, she has complete anosmia, and is generally unconscious of this offensiveness, and complains of a thick or crusted discharge from the nose, of the obstruction caused by its accumulation, or of dry throat, and cough. The atrophic process may spread directly to the pharynx or larynx, causing the symptoms of atrophy in these regions, either by direct extension, or, more commonly, by the inhalation of unfiltered air or of decomposing material.

The separation of the crusts may cause slight epistaxis. The ears are sometimes affected, and ocular disturbances have been

* *Journ. of Laryngol.*, viii., Feb., 1894, p. 96.

Complications must be treated as they arise. If suppuration in the sphenoidal or posterior ethmoidal cells is associated, relief, but not necessarily cure, of the nasal process may be hoped for.

Submucous injection of paraffin, first proposed by Lake * and Brindel,† is said to give satisfactory results.‡ It produces an artificial stenosis in the too roomy nostrils, so that crusts are easily blown out, instead of stagnating till they decompose and irritate the mucosa. Besides, the injected masses of paraffin produce, by reaction, increased vascularity, and hasten the sclerosis in which the disease eventually terminates, but without the usual collapse of the turbinals. This treatment is not suitable in cases where the turbinals are markedly atrophic, and is seldom indicated in patients over 40. It may be combined with local cleansings or surgical treatment. In early cases it may result in a practical cure, i.e. all local washings can be discontinued, secretions can easily be blown out, and the fetor ceases. Treatment must be carried out gradually, and persevered with. Paraffin may have to be injected along the septum and floor of the nose, as well as into the inferior turbinal. Injections may be made under cocaine. The first ones should be introduced as far back as possible. Further directions are given at p. 623.

If a paraffin fusible at 45° C. is employed, Broeckaert states that the injections are free from danger. Fliess uses a paraffin with a melting-point of from 50° to 52° C., as he states that severe and even fatal cases of embolism of the lung, or of the central artery of the retina, have been recorded with the softer forms.§ But Burger and others have found the method useless, and, as it is not free from discomfort and danger, it cannot be generally advised at present.||

General treatment.—Needless to say that the general health and hygiene of the patient requires attention. Good air and diet, and the avoidance of dust, alcohol, and tobacco, are important. Many patients who are anæmic are benefited by the syrup of iodide of iron or other ferruginous preparation. Even when syphilis is not suspected, a short course of iodide is sometimes called for to promote secretion and loosen the crusts. The seaside has long had a reputation in this complaint.

Other methods of treatment may be briefly referred to. The insufflation of antiseptic powders is best avoided. Their odour only masks that of the crusts, and favours the stagnation and desiccation of the secretion. Powders of citric acid, 25–35 per cent., with sugar or milk, have been recommended.¶ Caustics, such as nitrate of silver, and strong caustic or antiseptic solutions, are useless. Curetting should

* *Proc. Laryngol. Soc., London*, March, 1902.

† *Rev. Hebd. de Laryngol.*, xxi., i., 1902, No. 25, p. 721.

‡ Moure and Brindel, *Rev. Hebd. de Laryngol.*, xxiv., ii., 1903, No. 41, p. 417.
Broeckaert, *Soc. Franç. d'Oto-laryngologie*, Mai, 1906.

Broeckaert, *Presse Oto-laryngologique Belge*, Nos. 5–6, 1906.

R. Botey, *Ann. des Mal. de l'Oreille*, xxxv., ii., Nov., 1909, p. 564.

§ *Berlin. klin. Woch.*, March 7, 1904.

|| Burger, *Rev. Hebd. de Laryngol.*, 1905, i., No. 6, p. 158.

¶ Lewis Sommers, *Therap. Gazette*, March, 1900.

but both nostrils are generally involved. Occasionally a patch of membrane is found in the pharynx, generally on one side, and it may be met with in the postnasal space.

Bacteriology.—In the majority of cases the Klebs-Löffler bacillus is present. According to Lack, it may occur in pure culture and of full virulence.*

Symptoms.—These may be so slight as to be neglected, and in no case are they severe. The usual ones are obstruction and catarrh. The discharge at first is profuse and watery; later on it becomes thick, yellow, and blood-stained. Occasionally there is epistaxis; there is never fetor. In some cases the discharge is trifling, the only complaint being of obstruction. The glands in the neck may be slightly enlarged. The temperature may be raised to 100°. Beyond a little malaise in the early stage, the general symptoms are so slight that the child is never kept in bed, and advice is seldom sought except for the local discomfort.

Examination, in addition to the membrane described, will show the nasal chambers occupied with thick mucus and crusts.

Duration.—The membrane may disappear, and the nose return to normal, within a week; but while its average duration is about five weeks, the disease may persist for three months.

Prognosis is always good. No fatality has been recorded; spontaneous recovery is the rule. The affection has never been followed by paralysis, and the only possible sequelæ are adhesions between the septum and inferior turbinal (p. 81).

Diagnosis.—Although associated with the Klebs-Löffler bacillus, fibrinous rhinitis is, clinically, very different from diphtheria in the nose (cf. p. 676). The latter is an acute infection, with grave local and general symptoms, often accompanied by profuse epistaxis, apt to be followed by paralysis, and frequently fatal. Fibrinous rhinitis, on the other hand, is an ambulatory affection, with no constitutional symptoms, and is almost a local disorder. Locally, also, it differs from true nasal diphtheria in producing a more superficial necrosis.

So much is fibrinous rhinitis a local affection that the symptoms might be mistaken for those of a foreign body, particularly if one-sided. There being no urgency as regards the removal of the latter, a culture of the nasal secretion should be made before exploring for a foreign body, as this latter step in young children often requires a general anæsthetic (p. 167). When the membrane is semi-detached it may be mistaken for a collapsed polypus.†

* *Medico-Chir. Trans.*, lxxxii., 1899.

† C. J. Symonds, *Lancet*, Sept. 16, 1899, p. 785.

RHINITIS CASEOSA

Synonyms.—*Caseous rhinitis*; *coryza caseosa*; *nasal cholesteatoma*.

Definition.—A rare disease, first described by Duplay,* and characterized by an accumulation in the nose of a cheesy material with a horribly fetid odour.

Etiology.—Caseous rhinitis may occur at any age from 7 upwards,† and in both sexes. The most marked cases are generally in males, but this is possibly due only to their greater disregard of offensive symptoms.

The condition is generally regarded as symptomatic and not as a pathological entity. That is, it is not due to any alteration in the secretion of the pituitary membrane, but is the result of secondary putrefactive changes in pus which stagnates in the nasal chamber. The pus may have been produced by sinus suppuration, polypi, a foreign body,‡ tumours, or nasal stenosis. Other observers, while agreeing that this is the cause of some cases which they prefer to regard as pseudo-rhinitis caseosa, claim that this mechanical theory will not meet all cases, and that there is in addition a form of true rhinitis caseosa, which most of them ascribe to the *Streptothrix alba*.§

Symptoms.—The patient chiefly complains of the gradual onset of nasal obstruction and fetid discharge. The offensive odour, unlike that occurring in ozæna or in sinus suppuration, is perceptible both to himself and his friends. In addition there may be headache, and the usual sequelæ of nasal disease (p. 82). If the disease is marked there may be broadening of the nose and disfigurement, anosmia, and defective taste.

Pathological changes.—Examination will show, in one side of the nose, a yellow or putty-like cheesy material. This may be so large in amount as to fill a 3-ounce glass measure. The mass may push over and perforate the septum, destroy the inferior

* "Traité de Pathol. Externe," vol. iii., 1874.

† W. H. Kelson, *Brit. Med. Journ.*, Dec. 31, 1904.

‡ E. Law, *Proc. Laryngol. Soc., London*, vol. iv., March, 1897.
Dundas Grant, *ibid.*

§ Guarnaccia, *Arch. Ital. di Laringol.*, 1896, Anno xvi., fasc. 4.

Martuscelli, *ibid.*, Anno xvii., 1897, fasc. 2.

Martuscelli, *ibid.*, Anno xix., 1899, fasc. 3.

Masini, *Ann. di Laringol.*, i., 1900, Genova.

De Rosa, *Arch. Ital. di Otologia*, xi., 1901.

J. Bark, *Journ. of Laryngol.*, xviii., 1903, No. 12, p. 619.

Dardel, *Rev. Hebdom. de Laryngol.*, xxvii., 1906, No. 2, p. 32.

Mignacca, *La Pratica Oto-rino-laringoiatrica*, Anno vii., Aprile, 1907, No. 2, Milano.

J. Dundas Grant, *Proc. Roy. Soc. Med., Laryngol. Sec.*, April, 1909, p. 125.

CHAPTER IX

DISEASES OF THE SEPTUM

TRAUMATIC ULCERATION AND PERFORATION OF THE SEPTUM

Definition.—An ulceration due to local injury, limited to the cartilaginous septum, and generally going on to perforation, whereupon the process ceases.

Etiology and pathology.—At one time it was thought that most ulcerations of the septum, and nearly all perforations, were due to syphilis. This is now known to be a mistake. It is true that nearly all perforating ulcerations of the bony septum are due to syphilis, but when the cartilaginous septum only is attacked, the presumption is in favour of its not being due to a specific process.

This traumatic ulcer is conducted to by rhinitis sicca and deformities of the septum, particularly in patients subject to epistaxis (p. 100). In any case the exciting cause is the deposition of discharge or dust over the bleeding area of the septum (Fig. 56, p. 102). Even in healthy conditions a slight deposit of dust may occur about the centre of the cartilaginous septum, where it is directed by the current of air bounding off the external wall of the vestibule.* It is to this spot that the fine powder of chromic-acid workers is directed, and they are particularly apt to suffer from the condition under consideration. The manufacture of copper-arsenic green is said to produce perforation in 61 per cent. of the workmen.† The deposit of dust excites irritation which the patient, sometimes quite subconsciously, is apt to relieve by picking his nose or violently rubbing the external ala against the septum. In this way an abrasion is started which further attracts the deposit of dust, and forms a little scab. Attempts to remove this will start a shallow bleeding ulcer, which increases in surface and depth with each successive dislodgment of scab. If the process is not arrested it spreads down until the

* Charles W. Richardson, *Trans. Amer. Laryngol. Assoc.*, 28th Congress, 1906, p. 223.

† J. M. Brown, *Laryngoscope*, xii., 1902, p. 724.

the perforation caused by the galvano-cautery or other caustics it can only with difficulty be distinguished, except by the history of the case.

Hæmatoma and abscess of the septum may be followed by perforation of the cartilaginous septum. The opening is then larger and irregular, otherwise the pathological changes and results are the same.

Prognosis.—In the early stages the process can be arrested by treatment. Once the cartilage is exposed, perforation is almost inevitable. The perforation itself is of no seriousness, and seldom gives much annoyance beyond a certain tendency for mucus and dust to lodge on its margins.

Treatment.—The condition of matters must be explained to the patient, who is enjoined to abstain from picking the nose, and from clearing it with his finger, even though covered with a pocket-handkerchief. Violent blowing or external rubbing of the ala should be avoided. The deposit on the septum is softened morning and evening by the use of a warm alkaline lotion (Formula 8) until the crust can be shot out *à la paysanne*, or can be gently blown or wiped away. To the abraded surface a mild mercurial ointment is then applied (Formula 75). Healing, which is very slow, may be promoted by careful, infrequent applications of weak nitrate of silver, argyrol, chromic acid (gr. v or x to ℥i), or sulphate of copper. The epithelium, once destroyed, is not renewed. Hence a white, dry, scarred surface will remain permanently on the septum. Dust and secretion are apt to adhere to this, and the patient should be warned against starting the trouble again. He will be better able to avoid this by the occasional use of a cleansing lotion, and the application every evening of some emollient.

When perforation seems inevitable, Hajek recommends that the ulcerated surface be excised, thus ensuring a smaller perforation and a cleaner margin. Most patients are loth to submit to this, and it is doubtful if the surgery of nature is not equally satisfactory in this instance. When the perforation has formed, the margins should be kept very clean, and occasionally painted with chromic acid (gr. x to ℥i) or other astringent, until they are smoothly cicatrized over. If healing is retarded by the projection of the bare cartilage beyond its covering membrane, the mucosa should be reflected for a short distance on each side, and the bare piece of cartilage removed, so that when the reflected flaps are allowed to come together they cover over the perforation in the cartilage with a smooth, slippery, mucous surface (Fig. 73).*

* M. A. Goldstein, *Laryngoscope*, xvi., 1906, p. 879.

generally bilateral. This suggests that in all these cases there is an accompanying fracture of the cartilage.

Symptoms are those of obstruction, with some pain and stiffness.

Diagnosis is based on the recent history, and examination.

Prognosis should be guarded at first, as some days may elapse before we can be certain that the effused blood will not suppurate, and be followed by deformity.

Treatment.—If the hæmatoma is small, and not in a suppurating nose, evaporating lotions are applied externally and the swelling is left alone, but carefully inspected every day for early symptoms of suppuration. If the swelling is large and tense, it is safer to incise it freely, as described on the next page.

ABSCESS OF THE SEPTUM

Etiology.—If there is any defect in the mucosa covering a hæmatoma, it may become infected and suppurate. This is a common cause of abscess of the septum. An abscess may also arise by septic wounding of the septum; this may occur in operations on the accessory sinuses. Some cases of idiopathic origin are on record,* and the condition is said to arise spontaneously in enteric, smallpox, typhus, measles, glanders, anthrax, erysipelas, influenza, syphilis, tubercle, and by the extension of suppuration from the upper incisors.

Pathological changes.—A swelling takes place of the same shape, and in the same situation, as a hæmatoma. It is not so acutely deep-red in colour, but is more dull-purplish, and sodden-looking. There is fluctuation, not only over each watch-glass swelling, but from one side of the septum to the other. As this symptom is accompanied by marked tenderness on pressure over the end of the nose externally, it indicates that inflammation and partial destruction of the quadrilateral cartilage have taken place. The abscess may rupture, and pus and blood are then found in one nostril. Or this opening may be so small that a condition of chronic abscess may originate.

Symptoms.—The patient complains of nasal obstruction, with throbbing, heat, and tenderness. The nose may become quite occluded, and the bulging mucosa may be present at the orifice of the nostril. Efforts to clear the nose are painful and ineffectual. (Fig. 74.)

Diagnosis.—An abscess is distinguished from a gumma by the history, the youth of the patient, the symmetry of the bilateral swellings, and their position over the cartilage of the septum.

* Clinton Wagner, *Arch. f. Laryngol.*, vol. i., No. 1.
Bryson Delavan, *ibid.*, April, 1883, vol. iv., No. 2.

absolutely straight in the middle line. But it is only in a very limited number of instances that these deformities require to be corrected.

Etiology.—The predisposing and exciting causes may be grouped and considered in the following order:—

Predisposing causes:—

1. Diathesis.
2. Racial characters.
3. Age.
4. Sex.
5. Heredity.

Intranasal exciting causes:—

1. Defective septal development.
2. Affections of the septum.
3. Affections of other regions in the nose (high-arched palate, adenoids).
4. Excessive development of the turbinals.

Extranasal exciting causes:—

5. Traumatism.

Predisposing causes. 1. *Diathesis.*—Septal deformities are said to be exceedingly common among people suffering from the strumous, syphilitic, tubercular or rachitic diatheses.* Loewy † and Loewenberg ‡ emphasize the influence of rickets, and Harrison Allen calls attention to the influence of cretinism.§ These constitutional influences are seldom apparent in the cases which mostly require relief.

2. *Racial characters.*—All writers are agreed that septal deformities are vastly more frequent among civilized than among savage races. The examination of 2,152 skulls by Morell Mackenzie in the Museum of the Royal College of Surgeons showed deformity of the bony septum in 1,657, or about 75 per cent.|| Zuckerkandl, in 263 European skulls, found about the same proportion.¶ In other races this proportion is reversed, i.e. the septum is more frequently vertical than deviated. In 92 non-European skulls, Spiess found 68 symmetrical and only 24 unsymmetrical septa.** Among the Mongols, Africans, and Polynesians, deviations of the septum are only found in about 20 per cent. (J. O. Roe).

The examination of 400 skulls in Paris showed that the facial angle is more and more inflected in an ascending series as we proceed from the anthropoid ape to the European, and that, progressively with this, the septum is more prone to deviation.††

This increased frequency of deformities of the septum amongst

* John O. Roe, *Trans. Amer. Laryngol. Assoc.*, 18th Congress, 1896, p. 203; and *New York Med. Journ.*, Oct. 10, 1896.

† *Berl. klin. Woch.*, 1886, No. 47.

‡ *Zeitschr. f. Ohrenheilk.*, xiii., 1883, S. 11.

§ *New York Med. Journ.*, lxi., 1895, p. 139.

|| "Diseases of the Throat and Nose," vol. ii., p. 433. 1884.

¶ "Anatomie Normale et Pathologique des Fosses Nsales." Paris, 1895.

** *Arch. f. Laryngol.*, vol. i., 1894.

†† Potiquet, "Médecine Moderne," tome iii., p. 153. Paris, 1892.

place from behind forwards, would explain why deviations of the posterior end of the septum are almost unknown.

2. *Diseases of the septum.*—Hypernutrition from any cause may lead to a vertical or horizontal overgrowth. In this way spurs and ridges may occur, chiefly along (1) the junction of the vomer and superior maxilla, (2) the anterior border of the vomer and its junction with the quadrilateral cartilage or the ethmoid, and (3) the junction of the anterior border of the ethmoid and the cartilage. These are the three most common sites of spines and ridges.

3. *Affections of other portions of the nose.*—Many cases of deviation requiring operation are found in patients with high-arched palates. Not infrequently the stigmata left by adenoids, or even remains of these growths, are evident. As the high-arched palate encroaches on the space of the nasal chamber (p. 85), the thin and pliable septum cannot develop normally in the restricted and unyielding chamber in which it is confined, and therefore it tends to grow twisted.

4. The disproportionate expansion between the bony framework of the septum and the septum itself appears to me to be the chief predisposing cause, and in many cases also a sufficiently exciting one, although most deformities owe their origin to traumatism. Excessive development of neighbouring parts in the nose—the middle and inferior turbinals—has been suggested as acting by pushing over the septum to the opposite side. This interaction is probably in the opposite direction, i.e. the deviation is primary, and the hypertrophy in neighbouring parts is secondary and compensatory.

Extranasal exciting causes.—*Traumatism* is the most common of external exciting causes. This produces more or less disturbance or dislocation along the lines of junction of the ethmoid, vomer, superior maxilla, and quadrilateral cartilage (*see above*). Naturally, this would take place more readily during childhood, and a slight displacement at that age may frequently be seen becoming more marked as the septum grows. This increase, in such cases, may also be due to the callus thrown out in the efforts of nature to buttress up a weak junction.

In a large number of cases, both male and female, which demand relief, the nasal obstruction is often distinctly traceable to some blow or accident. In other cases there may be no history of traumatism, as the accident may have been looked upon as quite trivial at the time, and forgotten long before its consequences became evident. The probability that traumatism is a common cause is increased by the fact that deviations are much more common in males, who are more exposed to injuries than females. On the other hand, such observers as Zuckerkandl, Fletcher Ingalls, and Asch are sceptical in regard to the frequency of this influence.

Blowing the nose habitually with the same hand has been mentioned as a possible cause,* but the deviation does not affect one side more than the other with sufficient frequency to justify this hypothesis.

Pathological changes.—The deformities of the septum are often classified into spurs, deviations, and combinations of deviations and spurs.

Spurs.—A spur may consist of a crest or spine or thickening.

* Morell Mackenzie, "Diseases of the Throat and Nose," ii., p. 434. London 1884.

removed, while nasal breathing may be encouraged, and perhaps assisted, by wearing some dilator at night (*see* p. 108). But the catarrh is only too frequently kept up by the condition of the septum, and then operations on the turbinals are only of temporary help, as the hypertrophic condition is likely to recur (p. 151), and it is important never to sacrifice more of the inferior turbinal than is necessary.

Operation is called for when the deformity of the septum causes external disfigurement, mouth-breathing, catarrh, or epistaxis. It may be required when such neuroses as hay-fever, sneezing, and asthma are aggravated by the condition. The septum may require straightening in order satisfactorily to carry out treatment on the accessory sinuses, or nasal polypi, or through the Eustachian tube. Deviations of the septum are seldom the direct cause of ear-trouble, but they maintain catarrh, prevent ventilation of the middle ear, increase any deafness due to otitis media, and hence permanent improvement in suitable cases can be secured by removing them.

Treatment.—The number of methods devised for correcting deviations of the septum is an indication of the unsatisfactory resources hitherto at our disposal. Only the most useful will be described, and then the indications for a selection will be given.

Spurs and ledges.—When it is judged that relief can be obtained by removing a spur or ledge, without attempting to correct any twist in the septum itself, the following methods may be considered :—

Galvano-cautery.—This should never be employed. It is tedious, apt to leave behind dry rhinitis or adhesions, and much better methods are at our disposal.

Forcible straightening, by attempts to fracture the septum with Adams' or similar forceps, is clumsy, unscientific, and ineffectual. By such attempts the resiliency of the septum is not overcome, since it only bends and does not break.

Knife, saw, and spokeshave.—The first of these may be employed when the part to be removed consists of cartilage only. Such a condition is rare, and the organization of the scar is apt to leave as much obstruction as there was originally. The saw employed in the nose may be bayonet-shaped, or quite straight such as that of Cresswell Baber, Goldsmith, Woakes, or Holbrook



Fig. 79.—Straight nasal saw.

Curtis (Fig. 79). This last gives a better purchase, and can be more quickly worked, than the original hand-saw shape of Bosworth. When possible it is introduced beneath the deformity, directed inwards for the first few strokes, and then carried up-

Complementary treatment.—In any operation it may be necessary, in order to secure full benefit, to remove other obstructions, such as turbinal hypertrophies or adenoids (Fig. 94). The latter are best removed some weeks beforehand, in order to get quit of catarrh. Subsequent attention to alar collapse (p. 103), or mouth-breathing habits, may be required (p. 89).

Selection of operation.—Limited spurs or ledges on a fairly vertical septum, occurring in a nose otherwise adequately roomy, can be removed with a saw and spokeshave. A deviation of a septum into one nostril, particularly if there is no concomitant spur, can be relieved by producing a perforation as far back as possible. Such a condition may also be treated by a Moure or an Asch operation, and if it is associated with a spur or ledge, this may be subsequently removed in the manner advised.

These operations are best suited for fairly roomy noses. But as it is just in such noses that the ill effects of septal deformities are rarely felt, the indications for the above operations are seldom forthcoming.

In all other cases, in narrow noses, and whenever the operator is possessed of the necessary practice and skill, the submucous resection should be performed. It is suitable for every deformity, and will completely relieve even the worst. There need be no fear of collapse of the bridge of the nose and consequent deformity if sepsis is avoided, and a strip of cartilage is left (as seen in Figs. 91 and 92) like a bowsprit.

ADHESIONS OF THE SEPTUM

Etiology.—Adhesions are, in most cases, consequent on surgical measures. Traumatism to opposite surfaces stimulates granulations which, in narrow nostrils, may come in contact and organize. When the galvano-cautery is blamed, the adhesion is generally attributed to accidentally touching the opposite surface to the one being treated; but, occasionally, an adhesion will form even when one side only is cauterized; possibly the heat of the cautery-point, even in the absence of contact, excites swelling and reaction of the opposite side. Adhesions are also left in the nose by measles, scarlatina, diphtheria, and syphilis; but cases are occasionally met with in which no history of these affections, nor of traumatism, is obtainable.

Pathological conditions.—The adhesion, of varying extent, generally occurs between the septum and the inferior turbinal, but it may also form between the septum and middle turbinal, or between the two turbinals. An adhesion may be a small, limited

CHAPTER X

FOREIGN BODIES. RHINOLITHS. PARASITES

FOREIGN BODIES

Etiology.—Foreign bodies may enter the nasal cavities (1) through the anterior nares, (2) through the posterior choanæ, or (3) by penetration through the walls. They may also (4) arise *in situ*, as in the case of necrosed sequestra and rhinoliths. This fourth group will be considered separately.

The majority of cases occur in children, who push into their nostrils—and generally into the right, as corresponding to the hand with which they pick up the articles—any of the small substances which they encounter in their games, or when crawling on the floor. The list includes buttons, beads, pebbles, peas, beans, fruit-stones, and the like.

Foreign bodies occur much more rarely in adults, in whom we may, in addition, meet with such things as pieces of cotton-wool, gauze, or sponge, which have been introduced during treatment, and either overlooked or only partially removed. Lunatics may thrust strange substances into their nostrils.

Foreign bodies may be driven from the pharynx up into the nose when something is swallowed “the wrong way,” and, in the efforts to arrest or expel it, is forced up into the choanæ. They may also arrive here when vomiting takes place suddenly or violently. This accident may occur, too, in neuroses of the soft palate.

In those cases where the foreign body reaches the nasal cavity through its roof, floor, or walls, it is generally due to some external force, frequently a firearm. A Gordon Highlander in storming up the heights of Dargai was shot at from above, the bullet passing downwards through his forehead and destroying one eye. He suffered afterwards from a fetid discharge from one nostril for nearly two years, when it was entirely cured by the removal of the bullet and a fragment of khaki from the left nostril.*

* Claud Woakes, *Lancet*, 1900.

the like, and although it is not so serviceable in the case of fragments of sponge or cotton-wool, yet it helps to settle their situation, mobility, and consistence. In using it, care should be taken that the probe does not push the substance farther back. The X-rays may be of help.

Diagnosis.—In many cases the diagnosis is helped by the history of the case, although in children this is not always forthcoming, either because the child is too young or too timid to say what has happened, or because the date of the introduction is too remote. In children a chronic unilateral discharge, especially when offensive, should always raise the suspicion of there being a foreign body in the nose and should lead to a thorough exploration of the cavity. From nasal diphtheria the case is distinguished by the enlarged glands, the constitutional reaction, and the general bilateral character of the latter disease. Membranous rhinitis is also, as a rule, bilateral. It is of course possible that a foreign body is present in each nasal chamber. However, if the suspicion of one being present is even aroused, inspection and the use of the probe will settle the diagnosis. In older subjects the same proceeding will distinguish the condition from empyema, a rhinolith, and syphilitic necrosis.

Prognosis.—There is no tendency to the spontaneous exit of a body which has become lodged in the nose; but when once it is removed, the symptoms it caused will rapidly disappear. It is frequently overlooked in practice, from a neglect to note the one-sided character of the discharge.

Treatment.—If the foreign body is small and recently introduced, the patient may succeed in blowing it out; or it may be expelled if a sneeze is excited by a pinch of snuff or by tickling the nostril with a feather. Great care and gentleness is required in removing a foreign body from the nose. The extraction should never be attempted blindly, and no force is ever required. As a rule there is no necessity for haste, and there can be little harm, in the case of a substance which has probably been in the nose for weeks or months, in waiting until all arrangements are complete for ensuring its satisfactory extraction. In adults this can generally be effected after the nose has been cocainized, but in young children it is wiser to administer chloroform, as already recommended for examination, when, with the necessary instruments at hand, the examination can be completed and the removal carried out at one sitting.

In either case, after preparation with adrenalin and cocaine (p. 70), the nose being well illuminated and the nostril opened with a nasal speculum, the probe used for diagnosis will serve

production of pain, epistaxis, septicæmia, and sometimes convulsions, coma, and death.

Etiology.—The condition is brought about by the development within the nose of the larvæ hatched from the eggs which certain flies have deposited there. These flies appear to be allied to our own blue-bottle or house fly,* and are therefore attracted by anything like putrid meat, which affords the suitable nourishment for their larvæ when hatched. Hence it is that this distressing affection is most commonly met with in those who are already the victims of ozæna, syphilitic disease of the nose, and other purulent nasal affections, the flies being attracted by the fetid odour to deposit their eggs in or near the nasal cavities. It is rare for this to take place with a healthy mucous membrane, and the latter is so well provided with defensive arrangements (p. 5) that there would be little chance of the eggs being hatched. The patency of the nostrils associated with atrophic forms of rhinitis, and the custom, among natives of hot climates, of lying sleeping out of doors in the daytime when flies are laying, as well as their frequent disregard of cleanliness, are also favouring circumstances. The name under which the disease is met with in India, “peenash,” is used somewhat loosely and doubtless covers various other ulcerative processes in the nose.

The fly chiefly met with is the *Lucilia hominivora* or *Sarcophaga Georgina*. In Europe there are three kinds of flies, all belonging to the order of *Muscidæ*, which may deposit their ova within the nose or near its orifice. (Fig. 95.)

In one case I found that a hysterical female introduced the maggots into the nose herself.

Symptoms.—The visit of the fly to the nose is seldom noticed. The incubation period of the eggs is so short that frequently within a day or two symptoms of irritation are set up. There is a sensation of tickling and of something moving about, soon followed by sneezing and a sanious, bloody discharge. The irritation may amount to a distressing degree of formication, with severe pain over the root of the nose, the vertex, and the occiput, leading to restlessness, fever, and loss of sleep. The discharge becomes thicker, more purulent, and very offensive; maggots may be discovered in it; and the epistaxis may become severe. Œdema of the eyelids and face ensues; abscesses form in the neighbourhood of the nose, and when they burst the enclosed larvæ escape.

On inspection of a marked case, it is seen that the interior of the nasal chambers has been more or less completely destroyed. The extent to which this may be effected can be realized when it is remembered that as many as two to three hundred screw-worms have sometimes been ejected from a single case. Not only is the mucous membrane destroyed, but the cartilages and bones undergo necrosis, and the accessory sinuses are opened or filled with larvæ

* Vincent Dickinson, *West Lond. Med. Journ.*, ii., 1897, p. 203.

processes have already been referred to. In cases which have not received early treatment there is not only necrosis of the bony walls of the nasal cavities, but the accessory cavities have been invaded by the worms, and in fatal cases the meninges have been found to be inflamed.

Diagnosis.—Short of the actual discovery of the maggots in the nose, it is rather difficult to form a positive diagnosis. The symptoms mentioned, from their irregularity and in the absence of a satisfactory explanation, should arouse suspicions as to the possibility of infection by insects. According to some observers the screw-worms can, “as a rule, be easily seen and dislodged” by directly applying chloroform on cotton-wool.*

Prognosis.—Those cases which present themselves early are easily and satisfactorily dealt with. The outlook is grave in others which do not come under observation until extensive destruction of tissue has taken place, the deeper sinuses have become occupied by the larvæ, and general septic infection has set in.

Treatment.—The use of various antiseptics and germicides, however effective they may be shown to be against these larvæ when tested *in vitro*, is prohibited in the nose by the sensitiveness of the nasal mucosa. Fortunately there are two remedies which have almost entirely superseded the injections of turpentine, tobacco infusion, and lemon-juice, the insufflations of calomel, and other measures formerly employed. These two remedies are oil and chloroform. The former, which I mention first as it is nearly always at hand, destroys the insects by occluding their respiratory organs, and is innocuous to human tissues.† Olive oil or liquid vaseline may be either sprayed into the nostrils, or the nasal chambers can be entirely filled with it after the patient has been placed in the horizontal dorsal position with the head hanging over the edge of the couch. Chloroform was first recommended by Dauzats during the French expedition to Mexico in 1862.‡ It may be mixed with an equal volume of water and syringed down the nostrils, or the vapour may be inhaled.

By either method the larvæ are at once detached and easily brought away. Of course, where destructive processes have taken place the appropriate treatment must be instituted.

2. ENTOMOZOARIA IN THE NOSE

Etiology.—The list of animals which may be met with includes leeches, centipedes, earwigs, and ascarides. The possibility of

* Hall Foster, *Medical Rec.*, Dec. 22, 1900.

† Scheppegrell, *Laryngoscope*, iv., Feb., 1898, p. 86.

‡ Morel, *Recueil de M^d. Milit.*, 3^me série, xiv., 1865, p. 516.

CHAPTER XI

NASAL NEUROSES

ANOSMIA

Definition.—Anosmia, or loss of the sense of smell, is a symptom rather than a disease, but it is convenient to study the various causes of it in one section. This is the more important as the treatment will, of course, depend on the cause.*

Etiology.—For the normal perception of odours, three factors are essential:—

1. It must be possible for the odoriferous particles to come in contact with the olfactory region of the nose (Figs. 96 and 97).
2. The mucous membrane must be moist, and in a healthy condition.
3. The olfactory terminals and their nerve tracts must be normal.

It will be seen that interference with the sense of olfaction may therefore be (*a*) of a respiratory, or (*b*) of an essential character.

As one side of the nose is quite sufficient for the perception of odours, it is seldom that anosmia is complained of unless the affection is bilateral.

The loss of taste complained of by the patient is due to the abeyance of the perception of flavour, which depends on the sense of smell.

Examination.—The patient's own statement may generally be accepted with regard to the loss of the sense of smell, but it can be more carefully tested by the use of otto of roses, musk, valerian, and asafoetida. Care is, of course, taken to avoid the use of ammonia, vinegar, and other pungent vapours, which are recognized by the nerves of common sensation—the branches of the fifth nerve—and not by the olfactory. It may be necessary to determine if the anosmia is only one-sided. Its degree may be measured by Zwaardemaker's olfactometer.

Examination is then directed to seeing whether one or more of the following causative conditions are present:—

(*a*) **Respiratory.**—1. Misdirection of the air-current, caused by alteration or destruction of the *alæ narium*, which would allow

* Onodi and Zirkelbach, *Ann. des Mal. de l'Oreille*, xxx., ii., Déc., 1904, p. 654.

complete and continuous for some months there is little hope of success. The prognosis is worse the less evidence there is of any lesion to explain the loss of smell.

Treatment.—In Class 1 a plastic operation or a well-adjusted false nose will effect a cure. In Class 2 we may have to correct the alar collapse, remove obstructions, or attend to adhesions of the false palate. All but the blandest nose lotions should, if possible, be avoided.

In the essential class (group *b*) the hysterical form is treated chiefly by suggestion. In the other forms, if well established, there is little to be done. Electricity is difficult of application and of doubtful value. Strychnine or quinine may be tried. The following snuff, to be used twice a day, is recommended by Lermoyez :—

℞ Strychn. sulph.	.	.	.	0·10
Pulv. iridis	.	.	.	0·50
Sacch. lactis pulv.	.	.	.	10·00

Hyperosmia, or increased sensitiveness to odours, is sometimes met with in hysteria, hypochondria, and mania. It may result from any lesion causing irritation of the olfactory bulbs.

Parosmia, or perversion of the olfactory sense, with subjective perception of imaginary odours, is always a central nerve affection. It may occur in influenza, hysteria, hypochondriasis, epilepsy, and insanity.*

Cacosmia, the perception of a bad odour, is generally due to local disease or foreign body. It is rarely subjective and due to disease of the nerve tract, but cacosmia may be one aura of epilepsy. It should always entail a careful exploration of the accessory sinuses, chiefly the maxillary.

SENSORY AND REFLEX NASAL NEUROSES

The nose is richly supplied with nerves, both sensory and vaso-motor, rendering it one of the most sensitive regions of the body. Its susceptibility to irritation need not, therefore, cause surprise. This copious nerve supply connects it with the spheno-palatine, the Gasserian, and the superior cervical ganglia, and brings it into relation with the widespread branches of the sympathetic and the vagus (Figs. 96 and 97). Certain nasal reflexes are physiological, such as sneezing, lachrymation, cough, and the variations in turgescence and secretion. The neuroses of special sensation (olfaction) have already been studied (p. 176).

* F. St. John Bullen, "Olfactory Hallucinations in the Insane," *Journ. of Mental Sci.*, xlv., July, 1899, No. 190.

by giddiness, vertigo, faintness, paresis of the limbs, or exophthalmos, it is difficult to say whether the symptoms are due to a nasal reflex, to septic absorption, to the intimate relation between nasal lymphatics and the subdural and subarachnoid spaces, or to cocaine intoxication (*see under* Results of Operation, p. 74).

The diversity of view among various observers, and the large part played by suggestion in neurotic subjects, are exemplified in connexion with nasal dysmenorrhœa. This name was given by Fliess to cases of menstrual pain, of which he believed the true source was seated in the tubercle of the septum and the inferior turbinal. When these two points, called the genital zone, were anæsthetized with cocaine, the uterine pain ceased at once, and only recurred when the action of the drug had passed. To obtain a definite cure it sufficed, according to Fliess, to destroy the two points with a caustic or the galvano-cautery.* These observations were confirmed by Knorr, Koblauch, Schiff, Moll, and others. But Linder, substituting water for cocaine, found that suggestion alone could produce an equally wonderful effect.† Kuttner attributes the results to suggestion, the effect of the cocaine employed, or the general improvement in health which often follows the removal of any nasal stenosis.‡

To be nearly positive of a diagnosis of a purely reflex neurosis we must avoid attributing too much to a merely anatomical irregularity, and have absolute clinical proof (1) that the symptoms can only originate in the nasal mucous membrane; (2) that they can be completely arrested by applying a 10 per cent. solution of cocaine to the parts; and (3) that they can only be finally cured by direct treatment of the offending area.§

The question of reflex effects will enter into the study of several nasal disorders, but will be specially considered in connexion with hay-fever or spasmodic rhinorrhœa and asthma (*see* p. 188).

HAY-FEVER OR SPASMODIC RHINORRHŒA

Synonyms.—*Vaso-motor rhinitis*; *spasmodic rhinitis*; *paroxysmal rhinitis*; *paroxysmal rhinorrhœa*; *paroxysmal sneezing*; *intermittent neurotic catarrh*; *nervous coryza*.

Definition.—Intermittent engorgement of the nasal mucous membrane, associated with a free discharge of dilute mucus, frequently with paroxysmal sneezing and suffusion of the eyes, and sometimes with asthma.

* *Wien. klin. Rundschau*, 1895, Nos. 1, 2, 3, 5, 8, 9, 10.

† *Barozzi, Med. Press*, Aug. 12, 1903, p. 169.

‡ *Deut. med. Woch.*, 1908, No. 24.

§ Friedrich, "Rhinology, Laryngology, and Otology in General Medicine," p. 306. London, 1900.

G. Hudson-Makuen, *Amer. Med.*, vii., June 4, 1904, No. 23, p. 895.

no sufficient productive agent can be guessed at. The variety and temporary success of many kinds of treatment are looked upon as supporting the view that the neurotic element is the chief etiological factor. This is strengthened by such observations as the well-known one of J. N. Mackenzie, where an acute attack of spasmodic rhinitis was induced by giving a patient an artificial rose to smell !

Pathology.—The condition of the mucous membrane during an attack is that of passive engorgement. In some long-continued cases a condition of chronic hypertrophy ensues.

Symptoms.—A patient may feel in his usual health a few minutes before an attack. Then, without warning—it may be on getting out of the bed in the morning, passing into the sun or into the shade, or on approaching a hay-field or a bunch of flowers—he feels a tickling or dryness in the nose, perhaps the same sensation in the conjunctiva, and a sudden attack of violent sneezing ushers in a discharge of profuse watery mucus from the nostrils. The sneezing may be so violent and uncontrollable as to cause ecchymoses in the conjunctivæ. In other cases there may be only one or two sneezes, apparently started by the trickling of fluid in the nose—for often, after an initiatory sneeze, and before he is able to get out his handkerchief, the fluid will stream from the patient's nose on to the work he may be engaged on. The nose rapidly becomes occluded, imparting a nasal twang to the voice ; the ears feel stuffy ; there is conjunctival irritation, photophobia, and lachrymation. Headache, chiefly frontal, and a feeling of heaviness and malaise accompany the attack, and sometimes a short irritating cough forms part of it. The breathing may be wheezy, and asthma may accompany or alternate with the attacks ; the chest is often emphysematous. Spasmodic rhinorrhœa is very frequent when the patient rises in the morning, it may recur at any time through the day, though generally less severe, and a recurrence towards evening is not uncommon. There is complete cessation at night. The duration of an attack varies from a few minutes to an hour or more.

Examination.—During an attack there is swelling of the erectile tissue of the turbinals and increased secretion. The mucous membrane, especially that over the inferior turbinal, is often so swollen as completely to occlude the passage. If touched with a probe it is found to be elastic, the indentation which is caused re-filling at once, much as it would do with an air-cushion. There is no real œdema, nor is there necessarily any hypertrophy. The application of cocaine produces some retraction and secures a more complete view, but the improvement is transitory. The

The temporary ischæmia is followed by increased irritation, discharge, and obstruction.

Pollantin is the name given by Dunbar to an antitoxin obtained by animal inoculations with a toxin extracted from certain grasses and cereals. This serum is used locally in the nose. In some cases it only produces violent paroxysms of sneezing ; * in others it is useless ; † while some practitioners record cures in 60 per cent. of cases, and relief in 30 per cent.‡ It is advised to start treatment with liquid pollantin before the attacks begin, and to persevere with it in small doses.

In the intervals, or before the usual period for the onset of hay-fever, if sensitive spots are discovered in the nose they should be cauterized with trichloracetic acid (p. 64).§ The galvano-cautery has not only been applied to these spots, but has been greatly abused by recklessly destroying areas of healthy tissue. Still, if used cautiously, it will often secure relief with very little damage to the mucous membrane, and, in such a depressing and persistent affection, alleviation at that cost is not to be neglected. Applications to the boggy area over the tubercle of the septum may be made on each side at intervals of a week ; this may be followed up by cauterizing the lower anterior border of each inferior turbinal. The points to remember are that the benefit is not proportionate to the amount of tissue destroyed, and that the important functions of the inferior turbinals should always be respected. It is well to remember that the cautery may produce its effect (1) by inhibitory action, (2) by destruction of hyperæsthetic areas, or (3) simply by suggestion. A short course each spring may mitigate the severity of the summer catarrh.

Watson Williams recommends that at the beginning of the hay-fever season the nasal passages should receive one spraying with a solution of biniodide of mercury (2–5 per cent.), the application being preceded by cocaine and followed by a hypodermic of morphia. The preliminary use of cocaine is also required before painting the nasal mucosa with the following mixture of Sir Andrew Clark's :—

℞ Glycerini acidi carbolici . . .	3i . . .	30·00
Quininae hydrochloridi . . .	5i . . .	4·00
Hydrargyri perchloridi . . .	gr. ¼ . . .	0·015

This is often followed by considerable reaction ; if necessary, it is repeated on the second to the fourth day, but never more than

* Charles H. Knight, "International Clinics," vol. iii., 15th series.

† John N. Mackenzie, *Trans. Amer. Laryngol. Assoc.*, 1905.

‡ A. Lübbert and C. Prausnitz, *Berlin. klin. Woch.*, 1904, Nos. 11 and 12.

§ Killian, *Laryngoscope*, xvii., May, 1907, p. 341.

treatment should be tried to prevent the worst cases from getting into the hands of the quacks and charlatans who thrive on this disease.

Prophylaxis embraces the avoidance of the external irritant. When this is traced to some periodic visitant, such as flowering plants, it can be escaped by those who are able to take long sea-voyages. The island of Heligoland is a favourite resort.* Some cases are benefited, and others made worse, by the seaside; some find relief by spending the summer in a large city away from pollen, and by remaining much indoors during June and July. Where irritation of the conjunctivæ is a marked feature, they should be bathed with a boric or other lotion for some weeks before the expected attack, and protected by goggles. A visit to the arsenical waters of Mont Dore or Bourboule, or to the alkaline or sulphur springs of Ems, Royat, or Cauterets, is often attended with relief, particularly in those cases where the affection is not so clearly dependent on some external factor and is more akin to asthma.

Where it has been found beneficial, the use of pollantin, or limited applications of trichloracetic acid, or the galvano-cautery, should be commenced before the onset of the hay-fever period.

ASTHMA AND THE NOSE

The generally prevailing view is that bronchial asthma is a neurosis, in which the respiratory system is predominantly concerned, though reflex relations with other regions are often manifested. Cardiac and renal asthma are omitted from the following discussion.

The pathology of bronchial asthma is uncertain. According to one hypothesis it is caused by spasm of the bronchial muscles, while another explains it as a vaso-motor dilatation of the blood-vessels of the bronchi. Be that as it may, the connexion between asthma and the nose has long been recognized. Bosworth, indeed, goes so far as to state that "a large majority if not all cases of asthma are dependent upon some obstructive lesion of the nasal cavity."† Greville MacDonald says that he is "prepared to give a good prognosis to any asthmatic, whatever his symptoms, if he presents any degree of persistent engorgement or true hypertrophy of his anterior inferior turbinals."‡ And A. Francis goes even farther. His statistics, as interpreted by MacDonald, show "that whatever the state of the nose, free or obstructed, with

* Thost, *Lancet*, 1902, July 5, p. 49.

† "Diseases of the Nose and Throat," 3rd edition, 1897, p. 135.

‡ *Brit. Med. Journ.*, Nov. 5, 1904.

ingredient, should rarely be placed in a patient's own hands ; and on no account should an asthmatic be allowed to become possessed of a hypodermic syringe for morphia injections.

General treatment can never be neglected. Neurasthenia must receive suitable hygienic treatment, with appropriate tonics of iron, phosphorus, valerian, etc. Iodide of potassium or arsenic will give relief in some cases. I have seen attacks cut short by a hypodermic injection of 2 to 5 minims of adrenalin chloride, but alarming symptoms have been reported by others. The paroxysms may be controlled by inhaling the fumes of stramonium or chloroform, or by a spray of nitrite of sodium (grs. ii to ʒii) or one of the non-toxic proprietary preparations.

The chronic asthmatic will often be considerably relieved by visiting a health resort, where he can benefit by the pulmonary gymnastics of slow hill-climbing, or by the breathing exercises with compressed air and pneumatic chambers, combined with alkaline sprays. Among such are Harrogate, Ems, Wiesbaden, Baden-Baden, Mont Dore, and Cauterets. For further suggestions readers are referred to text-books of general medicine.

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NASAL HYDRORRHŒA

Synonyms.—*Rhinorrhœa* ; *rhinal hydrorrhœa* ; *dripping from the nose* ; *coryza vasomotoria periodica*.

Definition.—A rare and obscure nasal affection characterized by profuse discharge of watery fluid from the nostrils, without marked visible changes in the nasal chambers.

Nasal hydrorrhœa owes its existence as a separate affection to the prominence given to it by Bosworth in a study of 18 cases.* With the progress of knowledge hydrorrhœa tends to disappear from our list of diseases, and only remains as indicating a symptom. A criticism of Bosworth's cases shows that six of them were dependent on pathological conditions of the nose or its accessory cavities, and that in nine the fluid probably only traversed the nose on its way from the cranial cavity, so that his clinical picture is built up on three cases.†

When a profuse watery discharge from the nose is met with, the

* "Diseases of the Nose and Throat," i., 258.

† St Clair Thomson, *Brit. Med. Journ.*, Oct. 22, 1898.

remedies which are generally successful in mitigating the discomfort of the complaint.

Treatment.—This should be similar to that of hay-fever. The profuseness of the flow can often be checked by the administration of atropine and strychnine (p. 187). The constant current is recommended by Cresswell Baber.* Calcium chloride, in doses of 30 to 45 grains a day for two weeks, is warmly supported by Lake.†

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CEREBRO-SPINAL RHINORRHŒA

Synonyms.—*Dripping from the nose; escape of cerebro-spinal fluid from the nose.*

Definition.—A rare condition in which the cerebro-spinal fluid can escape from the anterior fossa of the skull and pass into the nose.

Symptoms.—It has long been known that after injuries to the base of the skull the cerebro-spinal fluid can make its way into the nasal chambers, but it does not appear to have been positively established as a pathological possibility that this escape could take place spontaneously, until the publication of a monograph by the author with a critical study of 21 cases.‡

From this it appears that the chief, and often the only, complaint of the patient is of a constant and long-continued dripping of watery fluid from the nose, generally from one side only. When collected, the fluid is found to be free from taste, smell, and sediment; albumin and mucin are practically absent from it; and when boiled with Fehling's solution there is a reduction of the copper. This is due to the presence of glucose, and, as this soon ferments and disappears, the test must be carried out on a freshly collected specimen.

* *Proc. Laryngol. Soc., London*, v., Jan., 1898, p. 29.

† *Brit. Med. Journ.*, July 9, 1910, p. 79.

‡ "The Cerebro-Spinal Fluid: its Spontaneous Escape from the Nose. With observations on its Composition and Function in the Human Subject." By StClair Thomson. London, 1899.

CHAPTER XII

INNOCENT AND MALIGNANT TUMOURS

BENIGN NEOPLASMS OF THE NOSE

TUMOURS in the nasal chambers are comparatively rare, and innocent tumours are more uncommon than malignant ones. Mucous nasal polypus, the most common new formation met with in the nasal chambers, is no longer regarded as a myxoma or even as an œdematous fibroma. It is, as we shall see, a result of chronic inflammation.

The benign neoplasms met with in the nose include (1) papilloma, (2) fibroma, (3) angioma, (4) osteoma, (5) enchondroma, (6) exostosis, and (7) cysts.

I. PAPILLOMA OF THE NOSE

This is one of the rarest forms of new growths in the nose. Owing to the confusion with papillary hypertrophy, which unfortunately received the name of "Hopmann's papilloma," several cases have been recorded as papilloma which evidently had no right to that title. There are in literature only about fourteen cases of true papilloma in which the diagnosis has been confirmed by histological examination.

Papilloma is rarely met with in the vestibule of the nose (Fig. 62, p. 109). Here it is really a skin affection, showing under the microscope the character of the typical papilloma, and, as on other parts of the cutis, it is apt to recur.

Symptoms.—A papilloma in the nose will make its presence felt by nasal obstruction and catarrh. Occasional attacks of hæmorrhage are more apt to occur in this form of nasal obstruction, and it may, in neglected cases, cause symptoms of pressure, the nose expanding externally, the flow of tears being obstructed, and the eyesight interfered with on the same side. The septum may be pushed over to the opposite side. But there is no bulging of the palate, the growth does not generally invade the choanæ, and the glands are not enlarged.

Examination.—This will sometimes reveal an external swelling

obstinate, recurring in spite of the use of acid nitrate of mercury, glacial acetic acid, salicylic acid, collodion, and other strong caustics. It is best destroyed with the galvano-cautery.

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2. FIBROMA

Fibrous new growths are exceedingly rare in the nose. Those which do occur generally take their origin from the posterior extremity of the middle or inferior turbinal, and project into the postnasal space, where they cause the same symptoms as the more-frequently-met-with naso-pharyngeal polypus (p. 318).

Pathology.—The growth is firm and irregular, but with a smooth surface. It does not bleed readily. Under the microscope it presents the ordinary characters of a fibrous tumour.

Symptoms.—A fibroma makes its presence known by the gradual development of nasal obstruction, generally limited to one side. For twenty-five or more years the stenosis may go on increasing, even bulging out the nose, and, if the growth descends into the postnasal space, pharyngeal symptoms and impaired action of the palate are added.

Examination.—Inspection, after a preliminary cleansing and cocainizing of the nose, will detect a smooth or granular, irregularly-rounded, opaque, dusky-grey, pink, or dull-red tumour. With the probe it is found to be dense and firm, and not particularly vascular. Manipulation with the probe will also reveal the origin of the growth from either the septum, floor, or one of the two lower turbinals. The middle one is the favourite situation. Detection of the point of implantation will depend on whether the pedicle is short or long, and hence on the growth being more or less fixed. In some cases the growth will project from the anterior naris, and in others it may only be discernible in the postnasal space.

Diagnosis.—This seldom presents any difficulty unless, as seldom happens nowadays, the tumour has been allowed to grow to such an extent that it has invaded the accessory cavities of the nose, pressed out the pterygoid fossæ, or descended into the pharynx. When, in addition, the surface has become ulcerated

Etiology.—This is unsettled. As the growth generally springs from Kiesselbach's area (Fig. 56, p. 102), it has been thought that it might be due to rhinitis sicca or local traumatism. It may occur between the ages of 6 (Norval Pierce *) and 70 (Wyatt Wingrave).

Symptoms.—Frequent and severe epistaxis from one side of the nose, which at the same time is more or less obstructed, should always demand a careful inspection of the interior of the cavity.

Examination.—This will reveal a sessile tumour on the cartilaginous septum, or attached by a thin pedicle. It is dark red and bleeds easily. The tumour is round, and generally smooth, although it may be somewhat mulberry-faced. The usual size varies from that of a small pea to a hazel-nut. In cases which have been neglected, the growth may have reached a size to obstruct the nose more or less completely, and from exposure to dust or irritation the surface may be ulcerating, while the repeated hæmorrhages will have given rise to the suspicion of malignancy.

An angioma sometimes originates from the adjoining floor of the nose,† or the anterior end of the inferior turbinal.‡

Pathology.—Some main points in its morbid histology are as follow :—"It is either a pure granuloma (then probably immature, and traumatic in origin) or, and much more commonly, a granuloma of doubtful etiology which has early undergone angiomatous change, spongy or cavernous, in a stroma which has certain of the characters of the succulent nasal mucosa. If, when sessile, a section is carried through to its cartilaginous base, no morbid affection of the latter or of the adjoining mucosa is seen, and if, after imperfect removal, it recurs, its angiomatous character is reproduced. Its histology is not affected by site—e.g. septum, floor, or ala of the nose—nor by length of pedicle. Proneness to ulceration, and hence to bleeding, is due to bacterial invasion of the epithelium from without. The abundant endothelioid cells, though they may be heaped somewhat around a blood space, do not produce a picture which can be mistaken for sarcoma."—(Pegler.)

Diagnosis.—If the growth is attached in the centre of Kiesselbach's area, and its appearance coincides with the above description, the diagnosis should be easy. If the attachment is lower down and more forward, it must be distinguished from lupus, papilloma, fibroma, and ordinary papilliform hypertrophy. The free bleeding and tendency to a rapid, fungating recurrence after incomplete

* *Journ. Amer. Med. Assoc.*, Feb. 19, 1898, p. 402.

† W. H. Kelson, *Proc. Roy. Soc. Med.*, Laryngol. Section, Jan. 3, 1908, p. 33.

‡ Somerville Hastings, *ibid.*, March 4, 1910, p. 102.

polypus, well illustrated, and with a full bibliography, to which I can only add the following :—

Marino Gaetano. *Pratica Oto-rino-laringoiatrica*, Anno vi., Dicembre, 1906, p. 20.

Vincenzo Cozzolino, *ibid.*, Agosto, 1906, p. 1.)

C. A. Parker and L. H. Pegler, *Proc. Roy. Soc. Med.*, Laryngol. Section, Dec. 6, 1907.

J. Trautmann, *Arch. f. Laryngol.*, Bd. xx., Heft 3.

4. OSTEOMA

This is a rare form of neoplasm. The hard ivory variety is met with more frequently than the soft cancellous. It originates from the ethmoid region, septum, or floor, and may be attached by a short, slightly movable pedicle. In some cases the tumour lies free and unconnected. The size varies from a pea to a goose's egg. An osteo-chondroma may cause extensive absorption of the cribriform plate, and spread into the sphenoidal and ethmoidal cells or the cranial cavity.*

Symptoms are those of gradually increasing obstruction, catarrh, and neuralgia.

Examination reveals a hard growth, generally pedunculated, and of a pinkish colour. Polypi may accompany and partially conceal the bony growth. This may extend in different directions, e.g. into the orbit, causing proptosis.† The tumours may be bilateral and symmetrical‡ (Fig. 100).

Prognosis.—In adults they can be left alone with safety if not causing inconvenience; for Sir Jonathan Hutchinson states that it is a law with most exostoses that they grow during the growth of the body, and cease to do so when full development has been attained.§

Treatment.—Small growths may be reached through the nostril with punch, chisel, hammer and forceps. Larger ones may require a Rouge's or a Moure's operation.

5. ENCHONDROMA

Enchondroma is very rare, and liable to degenerate into chondrosarcoma. It is met with generally in young males. It most often grows from the ethmoid, but has been found arising from the lower lateral wall, the frontal process of the superior maxilla, the septum, and from within the maxillary sinus|| The symptoms are those of obstruction and catarrh, developing slowly. It may produce external deformity. There is no tendency to epistaxis.

* Robt. Myles, *Laryngoscope*, xviii., April, 1908, p. 305.

† H. L. Lack, *Proc. Laryngol. Soc. London*, xi., Feb., 1904, p. 112.

‡ Otto J. Stein, *Laryngoscope*, ix., 1900, p. 27.

§ *Polyclinic*, ii., April, 1909, p. 259.

|| W. Uffenorde, *Journ. of Laryngol.*, xxiii., May, 1908, p. 269.

7. CYSTS OF THE FLOOR OF THE NOSE

The cysts about to be described are to be distinguished from those which occur in mucous polypi and those found in the anterior end of the middle turbinal.

The cysts found on the floor of the nose were first described by McBride.* They apparently occur chiefly in females.

Etiology.—According to Brown Kelly, who has closely studied the subject, these cysts have no connexion with the teeth. He regards them as simply retention-cysts. Other observers hold that they are always associated with some dental trouble.

Symptoms.—When small, these cysts may cause no inconvenience, and are often discovered accidentally. As they increase in size they may give rise to nasal obstruction and catarrh, and may cause some facial disfigurement by bulging out the ala nasi and upper lip.

Examination.—Inspection will reveal a light-grey or pinkish hemispherical swelling on the floor of the nose just behind the vestibule. As it increases in size it presses upwards and outwards, compressing the anterior extremity of the inferior turbinal, which then looks like the half of a "Philopena" almond. The cyst is sessile, and fluctuation is easily detected by placing one finger in the nostril and the other beneath the upper lip. On being punctured it gives exit to a thin, pale yellow fluid.

Progress.—The cyst may remain stationary for years, and give no trouble; or it may enlarge and cause local discomfort, neuralgic pains, and nasal obstruction.

Treatment.—If the cyst is small, it is sufficient to incise it and to allow of the escape of the contents. This may have to be repeated. If the cyst is larger, it is better to dissect it out through an incision in the gingivo-labial fold.

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 Brindel, *Rev. Hebdom. de Laryngol.*, 30 Avril et 7 Mai, 1898.
 Davis, H. J., *Proc. Laryngol. Soc., London*, vii., 1901, p. 74.
 Gerber (abstract), *Ann. des Mal. de l'Oreille*, xxxi., Oct., 1905, p. 401.

MALIGNANT NEOPLASMS OF THE NOSE

Frequency.—Malignant growths are not very frequently met with in the nose. Primary carcinoma is rare. Donogany and von Lenart affirm that only 80 cases have been published before their own contribution of 7.[†]

* *Brit. Med. Journ.*, May 14, 1892, p. 1011.

† *Arch. f. Laryngol.*, xv., 3 (quoted in *Rev. Hebdom. de Laryngol.*, 1904, No. 38, p. 358).

The operation can be carried out under cocaine, but on account of the free, sometimes furious, bleeding, it is better to prepare the patient beforehand (p. 74), administer a general anæsthetic, and plug the postnasal space (pp. 77).

The growth can then be removed with Luc's forceps, the wire snare, ring curette, spokeshave, and punch forceps, as in operation on the ethmoidal labyrinth. It is frequently advised to cauterize the base of the growth; it is difficult, on account of the bleeding, to do this at the time, but afterwards it may be attempted with the galvano-cautery or Paquelin's cautery. If any base or remnant is visible, it is wise to remove it surgically at subsequent sittings.

(b) External operation is indicated when the growth is very extensive. The operation of Moure through the side of the nose is very suitable for growths situated high up or far back in the nose (ethmoidal or sphenoidal region), and the scar left causes but little disfigurement. It is the best operation for dealing with a growth involving both the nose and the antrum, as occurs in many neoplasms of the ethmoid. Rouge's operation gives free access to both sides of the lower part of the nose, without leaving an external scar.

Sometimes these two operations should be performed together.

If the lateral wall of the nose is much infiltrated, or if the growth has invaded it from the maxillary sinus, then a Rouge and a Caldwell-Luc operation can be combined. The opening in the canine fossa is carried right through into the nose, so that one large cavity is made of the antral and nasal chambers, and the whole region right back to the postnasal space and up to the roof of the nose can be inspected and treated. Yet there is no external wound or disfigurement.*

Internal surgical treatment is simple, easy, and without danger. It can be repeated. It allows of seeing and removing the point of origin. There is no risk from hæmorrhage, and recurrences are easily watched. These are great advantages compared with the older methods.

In the operation of Ollier, described in textbooks on general surgery, the nose is reflected downwards from the root. It gives practically no approach to the roof of the nasal chambers, and is much inferior to Moure's operation. The other disfiguring operations of general surgery (Langenbeck, Dieffenbach), often requiring entire removal of the upper jaw, are seldom productive of lasting benefit. Our hopes should rather be directed to early diagnosis and the methods of operating recommended.

* Denker, *Arch. f. Laryngol.*, Bd. xxi., Heft 1.

CHAPTER XIII

NASAL POLYPUS

Synonyms.—*Mucous polypi* ; *œdematous polypi* ; *simple polypus of the nose*.

Etiology.—The causes of this common affection are not well established. Nasal polypi chiefly occur between the ages of 20 and 30, and are said to be more common in men than in women. They are very rarely found in the young. In 10,000 patients observed in ten years, only six cases were met with in children, the youngest being 6½.* The choanal or naso-antral polypus appears to be more common under 20 years of age, and is generally solitary (Brown Kelly); but ordinary ethmoidal polypi are frequently bilateral.

Frequency.—If looked for in the post-mortem room, nasal polypi will be found in one out of every eight or nine bodies examined (Zuckerkindl). In throat clinics they used to be met with once in every twenty patients (Morell Mackenzie).

Site of origin.—Mucous polypi never grow from the roof or floor of the nose, and rarely from the septum or inferior turbinal. They almost invariably arise from the outer wall, and principally from the margins of the middle meatus and the cells of the ethmoidal labyrinth. Hence they are found springing from the lip of the processus uncinatus, the lower and inner margin of the middle turbinal, the edges of the hiatus semilunaris, the infundibulum, and the bulla ethmoidalis (Fig. 102). But the ethmoidal labyrinth may be stuffed with masses of sessile polypi, weighing several ounces when removed, even when not a single polypus is visible in the nasal chamber (Figs. 108 and 109).

More rarely a polypus may take its origin in one of the accessory sinuses, and protrude through the natural ostium into the nose. This occurs most frequently in the maxillary sinus, and then the polypus generally passes backwards to hang into the postnasal space (*see* p. 318).

Histology.—A nasal polypus was formerly regarded as a typical example of a myxomatous tumour. More recently it was looked on

* Lacoarret, *Rev. Hebdomadaire de Laryngologie*, xxii., ii., 1902, No. 37, p. 333.

chiefly found at the bases of the polypi, and nerves are discovered with difficulty.

Pathology.—The pathological explanation of the origin of nasal polypi is uncertain. The various possible causes may be tabulated as follows :*—

I. PHYSICAL CAUSES

A. Anatomical.

- (1) Abnormal narrowness of the nasal fossæ, obliging the patients to make repeated efforts at clearing them.
- (2) Abrupt bending of the vessels in the ethmoidal mucosa opposite spurs, predisposing to osteitis and œdema. Spasmodic rhinorrhœa.

B. Irritative.

- (1) Foreign bodies.
- (2) Local traumatism.
- (3) Malignant growth.
- (4) Cerebro-spinal rhinorrhœa.

2. INFLAMMATORY CAUSES

A. Primarily attacking bone.

- (1) Necrosing ethmoiditis (E. Woakes).
- (2) Rarefying ethmoiditis (Lack,† Packard ‡).

B. Primarily attacking the mucosa.

- (1) Simple chronic catarrh.
- (2) Specific local infection.
- (3) Suppuration in the neighbourhood.

3. NERVOUS CAUSES

Spasmodic rhinorrhœa.

With regard to the above table, it may be mentioned that mucous polypi are not infrequently met with behind septal deviations and spurs; that they sometimes form around a foreign body or an osteoma; that the mere traumatism of removal, although perfectly successful at the time, may start a fresh group of polypi which subside spontaneously; and that I have seen them—slightly marked, it is true—on the one side of the nose affected with cerebro-spinal rhinorrhœa (p. 192).

But interest centres on the relationship of ethmoidal polypi to the underlying bone, and is divided between those who consider that disease originates in the bone and spreads outwards (Woakes, Lack, Packard), and others who regard the changes in the mucous membrane as primary, and the invasion of the bone as secondary (J. N. Mackenzie,§ J. Wright,|| Hajek ¶). Whichever view is held, there is

* Jacques, Soc. Franç. de Laryngol., 1903.

Jacques, *Rev. Hebd. de Laryngol.*, xxiv., Oct. 31, 1903, No. 44.

† *Proc. Laryngol. Soc., London*, 1902.

Clin. Journ., Oct. 21, 1903.

‡ Francis R. Packard, *Trans. Amer. Laryngol. Assoc.*, 1903.

§ *Journ. of Laryngol.*, Feb., 1897.

N.Y. Med. Journ., Nov. 13, 1897.

¶ *Arch. f. Laryngol.*, Bd. iv., Heft 3.

After-treatment.—The bleeding will generally cease spontaneously, assisted by cold ablutions to the face, or pinching the end of the nose until a clot forms (*see* p. 74). If bleeding persists, a piece of gauze, moistened with peroxide of hydrogen, should be packed in lightly, and removed as soon as the patient can lie down quietly. It is best to avoid the use of any plug. It was to plugging that Luc attributed the loss of a patient from meningitis consequent on the removal of a polypus.*

If the entrance to the nose is tender it may be smeared with a little menthol and boric ointment, ice-cold cloths may be kept across the bridge of the nose, and pain or sensitiveness can be relieved by a few doses of phenacetin or similar antineuralgic.

Insufflations of antiseptic powders are useless, and the nasal cavity should be left alone for twenty-four or forty-eight hours. A nose lotion should then be used two or three times a day, until the local condition is again inspected at the end of a week.

Any attempt to destroy the roots of the polypi by the galvano-cautery is useless and dangerous.

Removal of polypi with forceps in ethmoiditis.—It is now recognized that the "recurrence" of nasal polypi is generally accounted for by the frequent failure to detect disease in the underlying ethmoid bone, and suppuration in the neighbouring accessory cavities. Both of these causative factors must, therefore, be removed.

To remove the diseased ethmoid, together with its attached polypi, the nose is prepared with adrenalin and cocaine, the strips of moistened ribbon gauze being carefully tucked in between the septum and the ethmoidal region, as well as between this latter and the outer wall. The inferior turbinal and the front of the nasal cavity should be similarly prepared, so as to diminish vascularity, retract the healthy tissue, and thus increase the space for operating in, while lessening the risk of wounding the septum and so causing adhesions. At least one hour should be given for the solution to act. The operation is carried out while the patient is sitting upright in the ordinary examination-chair, with the body craned forward somewhat, and the head supported by a rest or held in focus by an assistant. Ready to the surgeon's hand should be some lengths, about a yard, of ribbon gauze (1 inch to 2 inches wide), and a vessel of cold sterilized water into which it is easy to shake off the growths as they are removed with the forceps.

If the middle turbinal has not already been removed, it is amputated as described at p. 125. In many cases of ethmoidal caries it is easily removed with nasal forceps.

The instrument I recommend is Luc's forceps* (Fig. 105), supplemented by Grünwald's punch-forceps (Fig. 70, p. 126). The former are introduced vertically, so that one blade passes between the

* *Rev. Hebd. de Laryngol.*, xxiv., Nov. 14, 1903, No. 46, p. 597.

PART III.—DISEASES OF THE ACCESSORY SINUSES

CHAPTER XIV

INFLAMMATION IN THE ACCESSORY SINUSES OF THE NOSE

THE study of acute and chronic inflammation in these cavities deserves careful consideration for the following reasons :—

1. It may reveal the true source of many cases of nasal and postnasal catarrh.

2. Distant and sometimes obscure symptoms may be traced to sinus suppuration.

3. The symptoms are frequently not characteristic.

4. There is often some associated affection in the nasal chambers.

5. Several sinuses may be affected simultaneously.

6. Evidence of sinus suppuration, or of its localization, in some cases, can only be arrived at indirectly.

7. The prognosis has to be very carefully considered.

8. The indications for treatment vary considerably in different cases, and according to the sinus affected ; hence

9. The importance of a complete diagnosis of all the sources of pus in the nose.

10. The affection tends in certain cases, as yet not well determined, to fatal sequelæ.

11. The detection and cure of the condition is sometimes an easy proceeding, and well within the powers of any practitioner.

12. In certain cases the diagnosis is difficult, and the treatment, which requires considerable study and skill, is not devoid of danger.

Other than inflammatory affections of the sinuses occur more rarely, and require shorter notice. Certain features of any sinus suppuration are common to all the cavities, and can therefore be studied together ; but each sinus requires individual consideration owing to (*a*) its shape, (*b*) the situation of its orifice, and (*c*) its relation to neighbouring organs. The anatomical data are of great importance.

semilunaris. One or more accessory openings are sometimes met with, also in the middle meatus, generally posteriorly to the ostium (Fig. 102). The junction of the base and the anterior wall forms what is frequently referred to as the floor of the sinus. It is really a rounded angle, lying above the alveolar border of the superior maxilla. The roots of the teeth, particularly the second bicuspid and first molar, are only separated from the cavity by a thin lamella of bone (*see* Fig. 107). The muco-periosteum is frequently arranged in folds or ridges. The floor of the maxillary sinus and that of the nose may be on the same horizontal plane, but that of the sinus is generally about $\frac{1}{2}$ an inch lower.*

A large adult maxillary sinus will hold 1 ounce of fluid,† but the cavity may be represented by a mere chink, or, more rarely, be entirely absent.‡

Development.—The maxillary sinus exists at birth in a rudimentary form, and reaches its full development about the age of 12 years.

Frontal sinus.—The following anatomical points are worth recalling: The cavity is smaller in young people, and in women than in men. There is no necessary relation between a prominent superciliary ridge and a capacious frontal sinus. The posterior wall is thin and brittle. The floor of the cavity overlies the roof of the nose and the orbit. The cavities are very irregular and unsymmetrical, and are separated by a septum which is seldom in the middle line except at its base. The ostium lies at the most dependent part of the cavity; it leads into the fronto-nasal duct, which opens into the anterior end of the hiatus semilunaris. The sinus may be completely absent on one or both sides (Plate VII.).

Development.—The frontal sinus is absent at birth and during infancy. It is seldom evident before the seventh or eighth year, when it gradually develops from one of the anterior ethmoidal cells, reaching complete development between the fifteenth and twentieth year.

The **ethmoid cells** have important relations, lying close to the orbit (Fig. 107), the cranium, and the ostia of the larger accessory cavities. The cells increase in size from above downwards, and from before backwards. They are divided into two groups, an anterior and a posterior. The anterior open into the upper part of the hiatus semilunaris by one or more openings, and therefore pour their secretions into the middle meatus and close to the mouths of the frontal and maxillary sinuses. The ostia of the posterior group are situated above the middle turbinal, and therefore open into the superior meatus of the nose and close to the mouth of the sphenoidal sinus (Fig. 102, p. 211).

Development.—As a rule the ethmoidal labyrinth is not apparent in infant skulls. It generally develops about the age of 4 or 5 years, and is not fully developed until about the twentieth year.

The **sphenoidal sinuses** are separated from one another by a septum which is seldom quite vertical. They are not often symmetrical. The orifice of the cavity is situated in the anterior wall, a few millimetres below the roof of the nasal cavity, and therefore communicates

* A. S. Underwood, *Journ. of Laryngol.*, xxiii., Nov., 1908, p. 620.

† W. A. N. Cattlin, *Trans. Odont. Soc., London*, xcix., 1857, p. 31.

‡ Morgagni, "De Sedibus et Causis Morborum." 1779.

as to the function of these cavities. They have been regarded as resonating spaces for the voice ; as serving for the secretion of mucus ; as assisting in directing the inspired air towards the olfactory region ; as vestigial accessory organs of smell ; or as helping to diminish the weight of the bony cranium.

SINUS SUPPURATION

Etiology.—Suppuration may arise primarily from direct infection of the sinus, or secondarily to some intranasal affection. Among the acute infectious diseases which give rise to sinusitis are influenza, pneumonia, enteric, measles, scarlatina, smallpox, cerebro-spinal meningitis, diphtheria, erysipelas, and, more rarely,

Fig. 108.—Coronal section in the anterior third of the nose, viewed from the front.

Shows the inferior and middle turbinates ; polyp growing from the ethmoidal region on each side, and polypoid degeneration of the lining of the left maxillary sinus. A probe is passed up into the frontal sinus on the left side.

glanders, mumps, and gonorrhoea. Coryza, and all processes in the nose associated with pus formation, may induce empyema in the accessory cavities. Predisposing causes have been found in acute rheumatism, peritonitis, contracted kidney, mercurial ptyalism, phosphorus-poisoning, and plumbism. The use of the galvano-cautery in the nose, nasal douches, and plugs, the presence of flies and larvæ and even of vomited matter (Harke), and diving into water feet-furthest (Lac), have also been productive of sinus suppuration.

1. Symptoms in neighbouring regions—the nasal chambers, pharynx, eyes, ears, head and face.
2. Symptoms in more distant organs—the lower respiratory tract and digestive tube.
3. Symptoms of interference with general health—prostration, loss of weight, fever, etc.

1. **Symptoms in neighbouring regions.** *Nasal symptoms.*—The two most usually complained of are (1) obstruction, and (2) discharge. The obstruction may be unilateral or bilateral; it is usually more marked in the morning hours, and varies with the amount of secretion, the weather, the general health, the cavities affected, and any recent increase of catarrh. The discharge may flow forwards or backwards—in the latter direction chiefly when the posterior group of sinuses is affected (p. 223). It presents many varieties of pus and muco-pus, both in quality and amount. It may necessitate the use of as many as a dozen and a half handkerchiefs in the twenty-four hours. Sometimes it is so slight that patients have unconsciously swallowed it for years.

Hypertrophic rhinitis, atrophy of the nasal mucosa, rhinitis caseosa, and nasal polypi may all be traceable to sinusitis. Disorders of smell and taste are often indicative of the disease. There may be parosmia, or anosmia. Cacosmia is, when complained of, very symptomatic of sinus suppuration. The smell is seldom perceptible to the patient's friends, and this helps to distinguish it from the smell of true ozæna, which can be perceived at some distance, although undetected by the patient.

Symptoms in the naso-pharynx and pharynx.—Postnasal catarrh and Tornwaldt's disease (bursitis pharyngea) are often symptomatic of sinusitis, as may also be inflammation, suppuration, and abscess in the pharyngeal and palatine tonsils, the pharynx, and the cellular tissues of the neck.

*The eyes.**—Symptoms in the orbit or eye may be produced

* J. H. Bryan, *Journ. Amer. Med. Assoc.*, Nov. 11, 1899, p. 1197.
 Ziem, *Journ. of Laryngol.*, Aug., 1901, p. 417, and May, 1910, p. 242.
 Ziem, *Arch. Internat. de Laryngol.*, xxi., 1903, No. 6, p. 1173.
 R. Sattler, *Journ. Amer. Med. Sci.*, May 18, 1901.
 de Milly, *Bull. de Laryngol.*, iv., 1901, p. 79 (a Thesis).
 A. Robin, *ibid.* (a Thesis).
 F. de Lapersonne, *Ann. des Mal. de l'Oreille*, xxviii., 1902, No. 9, p. 217.
 Schmiegelow, *ibid.*, xxxi., Jan., 1905, p. 84.
 Paul Joly, *Rev. Heb. de Laryngol.*, xxv., 1904, No. 15, p. 427.
 G. Gellé, *Arch. Internat. de Laryngol.*, xvii., 1904, No. 1., p. 8.
 G. Laurens, *Gaz. des Hôp.*, 7 Sept., 1895, p. 1021.
 E. Baumgarten, *Journ. of Laryngol.*, xxi., Aug., 1906, 400.
 E. Berger and T. Tyrman, "Die Krankheiten der Keilbein-Höhle und des Siebbein-Labyrinthes und ihre Beziehungen zu Erkrankungen des Sehorganes." Wiesbaden, 1886.
 Emile Moreau, "Manifestations Oculo-orbitaires des Sinusites Sphénoïdales." Lyon, 1905.

CHAPTER XV

CHRONIC SUPPURATION OF THE MAXILLARY SINUS

Synonyms.—*Empyema of the antrum of Highmore; maxillary sinusitis.*

The **symptoms** may be any of those enumerated as common to pus in an accessory cavity (pp. 233 to 236). If the secretion of pus is so small that it only overflows occasionally into the nasal chambers the objective symptoms may be slight, although the patient complains of cacosmia, neuralgia, faceache, and so forth. In a doubtful case the patient should be examined in the morning hours, since, after mid-day, the sinus has often become so emptied that no pus escapes into the nose during the rest of the day. When the ostium is obstructed, and when an acute exacerbation is grafted on the chronic condition, attention is directed to the affected sinus by the redness, swelling, and tenderness of the cheek and lower eyelid on the same side.

Examination of the nostril on the affected side will generally reveal pus in the middle meatus, and in the posterior choana it is seen lying below the end of the middle turbinal. But the pus may also have spread to the olfactory cleft, or have accumulated in the floor of the nose. To determine the exact source, the nose should be carefully wiped out with pledgets of cotton-wool moistened with a 5 per cent. cocaine, and examined after a few minutes, when pus will have reappeared under the middle turbinal.

Pressure test. Supposing the pus does not speedily make its appearance, the patient should bend the head well forwards between the knees with the affected side uppermost. This test, known as Flaccini's, brings the ostium maxillare into the most dependent part of the sinus so that when the head is raised, and the nose again inspected, a stream of pus will be found in the middle meatus.

The test of transillumination, chiefly developed by Heryng, requires accurate examination evidence. It requires a small light source, such as a 1 or 2 ampere current, encased

complete cure of suppuration ; or (4) the presence of malignant or other neoplasm. On the other hand, transillumination may give negative evidence, although the antral cavity is diseased, owing

Fig. 115.—Relation of dental disease to suppuration in the maxillary sinus (semi-diagrammatic).

The right side shows caries of the crown of a first molar tooth, and an abscess at the root. On the left side a pyorrheic pocket of pus is seen on the outer side, and a watch-glass swelling on the palatine side. (*After Mahu*.)

(a) to the cavity happening to be more or less empty at the time of examination, or (b) to the bones being particularly thin and translucent.

The test is, in fact, only a supplementary one. If it gives a positive result it may be confirmatory, or arouse enough suspicion

Fig. 116.—Relation of dental disease to antral suppuration (semi-diagrammatic).

On the right side the abscess at the root of a molar tooth has broken into the antral cavity, but has pushed the muco-periosteum in front of it. On the left side the dental suppuration has burst into the cavity of the maxillary sinus. (*After Mahu*.)

to justify an exploratory lavage ; if negative, it may point to other cavities as the source of the pus.

Conclusive evidence of a maxillary sinusitis can only be obtained by the expulsion of pus from the cavity. This is done by exploring

* *Annales des Mal. de l'Oreille*, xxxii, n., No. 10, Oct., 1906, p. 353.

preferable to a labial (Fig. 121). It is rare for this simple operation to be attended with a serious hæmorrhage.*

As the drill is withdrawn the escape of pus will often confirm the diagnosis. When the patient has recovered from the anæsthesia the lotion and air should be sent through the cavity, as already described, and an obturator of rubber inserted to maintain the patency of the opening for future treatment. If the result of the exploration is negative, no harm is done, and the opening, if left alone, will close up in twenty-four hours.

Fig. 120.—Surgical anatomy of the maxillary sinus.

Semi-diagrammatic coronal section of the nose, with the maxillary and ethmoid sinuses. The roots of the first molar teeth have been sketched so as to show that the drilling of a tooth socket might lead on to the cheek, or into the nasal cavity, if the directions in the text for reaching the maxillary sinus are not observed.

Exploration through the canine fossa.—This route is unsatisfactory, as it is more painful and not well suited for establishing treatment. It need only be adopted when no tooth-socket is available, when attempts to explore the antrum from the nose have failed, and when the diagnosis cannot otherwise be established. It can be carried out under nitrous-oxide gas or local anæsthesia. A small incision is made down to the bone just behind the prominence of the canine fang; the muco-periosteum is reflected upwards and downwards and a drill is employed as for the alveolar opening, but directed vertically to the surface of the canine fossa. The exploration of the contents is carried out as already directed.

Diagnosis.—Obstructed cases have been mistaken for malignant disease of the antrum; and, on the other hand, the association

* Scheppegrell, *Journ. of Laryngol.*, ix., 1895, No. 9, p. 621

diminution in the amount and purulence of the discharge, the lavage may be repeated at increasing intervals, particularly if the discharge shows a relatively small number of lymphocytes, and an absence of the *Streptococcus pyogenes*.^{*} It is difficult to say beforehand what prospect there is of curing a chronic case by lavage through the nasal wall. It is not worth trying more than half-a-dozen times, unless there is decided improvement.

Making an opening in the antro-nasal wall.—The creation of a large opening in the antro-nasal wall, so as to permit of drainage

Fig. 122.—Method of catheterizing the maxillary sinus.

and treatment through the inferior meatus, has lately come much into favour. Originally suggested by John Hunter, the method was carried out by Mickulicz and Krause, and has been developed by Réthi and Claoué.[†]

Anæsthesia.—The operation, after preliminary preparation of the nose (see p. 70), can be performed under an anæsthesia of nitrous oxide and ether, or chloroform can be employed. On the Continent and in America it is frequently carried out under local anæsthesia. The nose on the affected side is packed with adrenalin and cocaine (p. 218), and $\frac{1}{4}$ gr. of eucaine (p. 71) is injected into the antral cavity through a bent needle thrust through the middle meatus.

^{*} J. M. Darling, A. Logan Turner, and C. J. Lewis, *loc. cit.*

[†] L. Réthi, *Wien. med. Woch.*, 1901, No. 52, 1903, No. 12, 1904, No. 34; and *N.Y. Med. Journ.*, Feb. 9, 1907.
Claoué, *Semaine Méd.*, 15 Oct., 1902.

used with it does not appear in most cases to be of great importance. Normal saline solution is generally satisfactory, and in cases of fetor we may add peroxide of hydrogen, permanganate of potash, listerine, sanitas, or one of the non-irritating compound antiseptics. At first the washing out should take place morning and evening, the obturator being inserted immediately afterwards. If this is neglected, granulations spring up within an hour, or less, sufficient to impede or even entirely prevent replacement. When the

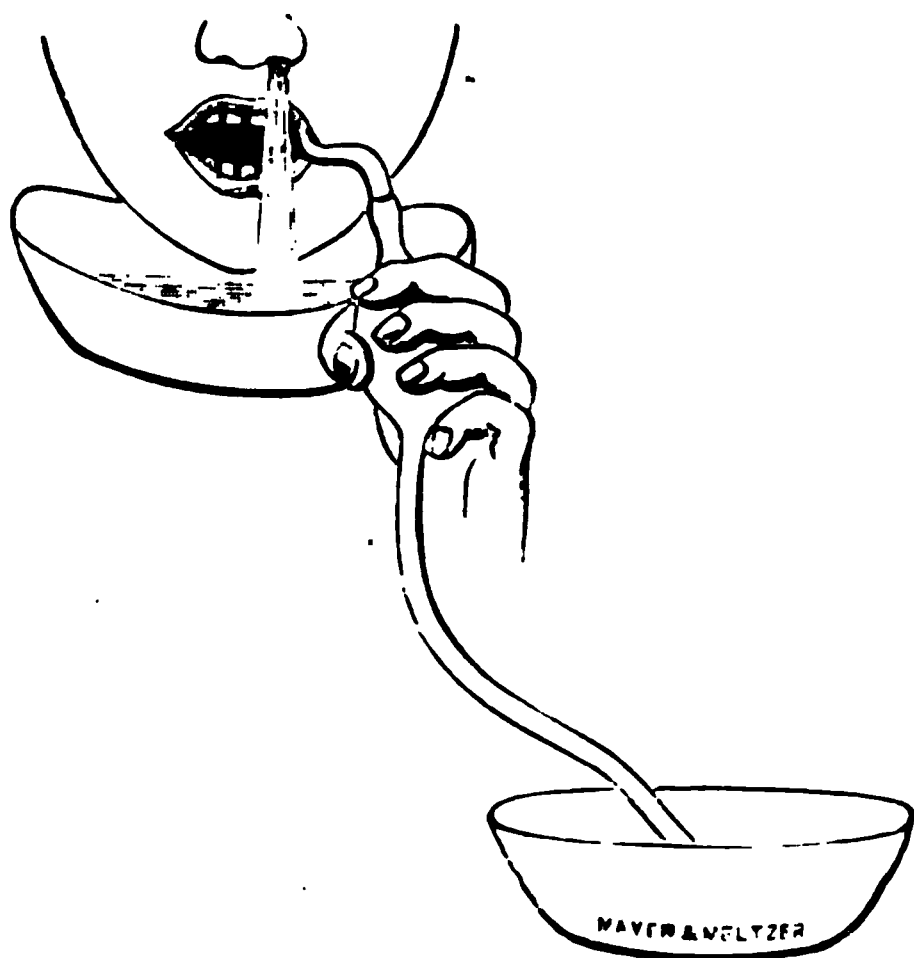


Fig. 127.—Syringing out the left antrum from an opening in the alveolar border.

liquid escapes from the nose in a clear stream the washings are diminished to once a day, then to every other day, and so gradually to once a week. When the cavity on several occasions is found to be free from secretion after remaining uncleaned for a week or two, we may consider the case cured, and allow the alveolar opening to close—which it does spontaneously on discontinuing the obturator.

If the secretion persists, we may try the use of stronger antiseptics or astringents, such as bin-

iodide of mercury, chinosol, protargol, argyrol, sulphate of zinc, before resorting to more radical measures. Sometimes when the secretion is tenacious or grumous it is well to introduce some peroxide of hydrogen into the cavity.

Results.—Cases which are going to yield to this method show improvement within a few weeks, and are generally well within three months. In some cases the treatment has to be kept up for a year or more, though with less prospect of complete arrest. In many such cases only a trace of muco-purulent secretion remains, requiring a lavage once or twice a week. Although subject to exacerbations after contracting an acute catarrh, patients frequently prefer to tolerate the inconvenience and wear an obturator indefinitely rather than submit to operation. When any other sinus on the same side is suppurating, the alveolar opening should be maintained, both from fear of re-infection, and because it might

through the canine fossa only. This procedure is now generally abandoned.

(*b*) By an opening through the antro-nasal wall only. This is now the usual operation in all chronic cases.

(*c*) By an opening through the canine fossa, and a second opening through the antro-nasal wall (Caldwell-Luc). This is reserved for more inveterate cases; for those in which the preceding operation has proved a failure; and for cases of foreign body.

(*d*) By the Caldwell-Luc operation as modified by Denker and Bœnninghaus. The technique of these operations is difficult, and they have not been generally adopted.

(pp. 241 and 243). If the antrum is then washed out, we determine whether the cavity contains pus, and, if it does, we see that it is completely expelled. If we now wait for ten to twenty minutes, and, then, on examining the nose, again find pus in the middle meatus, we can be certain that this, in such a short time, can only have originated from the uncleansed frontal sinus or the anterior ethmoidal cells. If there is no recurrence of pus, then only the maxillary sinus is affected. If, again, no pus was expelled on puncturing the latter, then the origin of the nasal pus is more certainly established in the frontal cavity. And, finally, if pus was expelled on syringing through the antrum, and yet recurs quickly in the middle meatus, we have shown that both cavities are affected.

Sounding the frontal sinus.—It is rarely possible to catheterize the frontal sinus in the healthy nose; but when the neighbourhood of the infundibulum has been broken down by polypoid growths and necrotic changes, it is frequently fairly easy. It is wiser to secure free access to the fronto-nasal duct by amputating the anterior end of the middle turbinal (p. 125, Figs. 68 and 69). This procedure will in any case be required as a method of treatment if, later on, the sinus is found affected. The sinus can then in many cases be catheterized, as described below (Fig. 132).

Complications.—The most common is suppuration in the ethmoidal cells, revealed by the presence of polypi and pus in the area of the middle turbinal. It is indeed exceptional in a case of any standing to find the frontal sinus affected without participation of the ethmoidal labyrinth. The pus not infrequently finds its way along the hiatus semilunaris until it reaches the ostium maxillare and trickles into the antrum. This cavity in its turn may then become infected, or it may simply act as a reservoir of pus which will cease to be found there as soon as the pyogenic process has been arrested in the higher sinuses.

TREATMENT

1. Intranasal treatment. i. **Puncture of the floor of the sinus.**—This method, suggested by Schaeffer,* is so dangerous that it is only mentioned to be condemned.

ii. **Catheterizing and washing-out the frontal sinus.**—When the nasal chamber is healthy it is extremely difficult to catheterize the frontal sinus. But, clinically, we are able to succeed in passing a catheter into the sinus in more than half the cases we

* *Deutsch. med. Woch.*, Oct. 9, 1890, p. 905.

drainage, it may require correction by a submucous resection (*see* p. 158).

In some cases it is impossible to say whether the cannula has really entered the frontal sinus. A radiogram will settle this point, and should be made in all cases, as it will eventually be required to determine the size and extent of the sinus* (Plates v. and vi.).

When the cavity can be catheterized from the nose it should be washed out daily with liquids, similar to those indicated for suppuration in the maxillary antrum (p. 250). A permanent cure is rarely effected by this treatment in a well-established case of chronic suppuration. In a case in which I was certain that the suppuration was not of more than four months' duration, intra-nasal treatment was a failure, although carried out most carefully on forty-four successive days.† The cause of failure is apparent whenever these sinuses come to be opened, for then it is generally found that the cavity itself is stuffed with fungating mucosa, and that the fronto-ethmoidal cells, where the lavage never penetrates, are affected in the same way.

Still, the treatment is indicated (1) as a first step in diagnosis and treatment, and (2) to diminish the risk of retention and decrease virulence in those patients where an external operation is not indicated, or is declined (p. 270). Unfortunately the technique is one that patients can rarely learn for themselves, and is, indeed, only acquired by special training.

2. The external operation.—i. At the present time the **Killian operation** is the one most generally employed.

Preparation.—A radiogram is taken to indicate the size and extent of the frontal sinus, and prepare the surgeon for meeting with troublesome orbito-ethmoidal cells (Plates iv. and vii.).

As the ethmoid is diseased in nearly all cases, it should be cleared away at previous sittings, under cocaine or chloroform (p. 218). Even when healthy, the anterior extremity of the middle turbinal should be amputated (p. 125). If the antrum is also suppurating and a suitable tooth-socket is available, the alveolus will have been drilled at one of these preliminary treatments. If the sphenoidal sinus is suppurating, its orifice will have been enlarged, and the cavity treated (*see* p. 276).

One hour before the operation, strips of ribbon gauze, soaked in adrenalin with the addition of 5 per cent. cocaine, are carefully laid all over the mucous membrane of the nose on the affected side. The face, moustache and beard are well purified. When the patient is under chloroform three pencils of tightly rolled cotton-wool are introduced into the nose—one along the middle meatus, a second in front of the inferior turbinal upwards towards the bridge of the nose, and the third in the inferior meatus. A sponge is inserted in the postnasal space (p. 76). There is no advantage in shaving off the

* Spiess, *Journ. of Laryngol.*, Nov., 1899.

† *Proc. Roy. Soc. Med.*, Laryngol. Section, Dec., 1907.

parts of the lachrymal, of the lamina papyracea, and of the floor of the frontal sinus. The whole of the floor of the sinus must be removed, by working either from above the bridge or from below it. If this cannot be done without anxiety as regards the attachment of the pulley of the superior oblique, it is better to risk this than to leave pus-secreting pockets of orbito-ethmoidal cells in the roof of the orbit. But the pulley of the superior oblique should never be divided from its attachment to the rim of the orbit. It is much safer further to

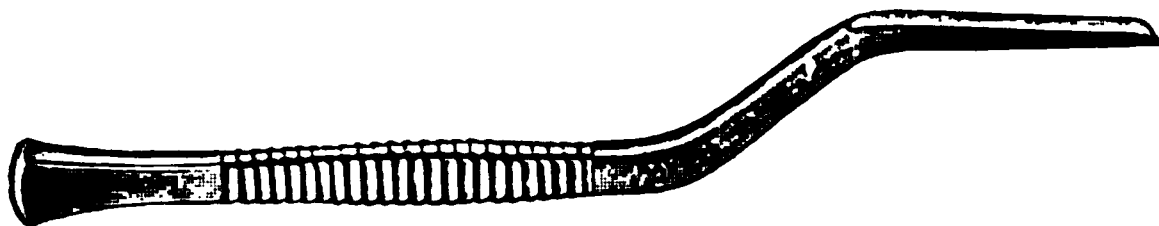


Fig. 138.—Killian's bayonet-shaped chisel.

reflect the periosteum outwards and downwards from the lower border of the Killian bridge. In doing this the pulley of the superior oblique may be detached with it. Any diplopia—most noticeable on looking downwards and outwards—is generally temporary, and, as a rule, it will disappear when the swelling subsides and the periosteum gets back to its anchorage. It may persist for one to six months.

It is this part of the operation which is the most delicate, tedious, and important. It is very common to meet with irregularities. The orbital recess of the frontal sinus itself may run back in the roof of the orbit nearly as far as the foramen opticum. One or two galleries may be met with in the roof of the orbit—prolongations of orbito-



Fig. 138a.—Killian's triangular curved chisel.

ethmoidal cells—passing outwards as far as the temporal end of the eyebrow, as indicated in Fig. 139. Their presence can only be revealed after removal of the floor of the frontal sinus proper, and in this way two or three bony dissepiments may have to be removed before the orbital fat rises, as it should do, to occupy the lower part of the exposed frontal sinus. In this part of the operation much help is obtained by the careful use of a probe, by frequently securing a field free from bleeding by pressure with adrenalin or peroxide, and by the knowledge previously gained by skiagraphy. If the Röntgen rays have shown that the frontal sinus does not extend above the level of the bridge, or if radiography is not available and there is any uncertainty as to the extent of the cavity, this lower opening should be made first.

In the inner part of the large orifice which has been made below the bridge, the deeper ethmoid cells can be treated, and the sphenoidal ostium is much nearer than when viewed from the introitus narium, so that it is easy to enlarge it and deal with the contents.

The whole area of operation is next carefully cleansed with warm normal saline solution. Any projecting corners, or loose spicules of bone, are removed. If any point of pus should show up it must be carefully followed to its source. The cotton-wool pledgets are removed

they are applied to the posterior wall. This, naturally, effects a complete obliteration of the cavity, but in order to secure it the orbital ridge has frequently to be removed to such an extent that a frog-like prominence is given to the eye, and the resulting disfigurement is very marked. Besides, this operation does not deal with the orbital recess of the sinus, or the orbito-ethmoidal cells—the most important part of the operation. In fact, the only advantage of this procedure—complete obliteration of the sinus—is as well secured by Killian's operation, which also allows these regions to be dealt with, permits free drainage into the nose, and avoids disfigurement.

FOREIGN BODIES

These have been incidentally referred to already. They are most frequently met with in the maxillary sinus. Considerable help is given in the diagnosis and treatment of such foreign bodies as metal drainage-tubes, broken ends of instruments, and bullets, by the employment of the Röntgen rays. A piece of metal has been known to lodge for four years in the antrum without causing important symptoms.*

A concretion (rhinolith) is exceedingly rarely met with in the antrum. Some 5 cases have been recorded.†

TUBERCULOSIS OF THE ACCESSORY SINUSES

Very few cases have been described. As a rule the tuberculosis is only an extension to the sinus from some neighbouring focus. In most instances the patients have pulmonary tuberculosis.‡

* J. O. McReynolds, *Laryngoscope*, xviii., March, 1908, p. 215.

† E. Oppikofer, *Arch. f. Laryngol.*, xx., i.

‡ J. W. Gleitsmann, *Trans. Amer. Laryngol. Assoc.*, xxix., 1907, p. 88.

of subinvolution has taken place. The tonsil is then harder, possibly from the result of repeated inflammatory attacks. The ridges and folds may still be present. As a rule the tonsil is more contracted, and may have shrunk into a central pad. Or it may be more spread out and diffused, so that its boundaries are ill defined, and it merges gradually at each end into the surrounding surface, while at each side it shades off into the lateral walls and the posterior lips of the Eustachian orifices. It is this last process of fibroid atrophy which sometimes leaves behind it the cicatricial bridges or adhesions that may be seen in the fossa of Rosenmüller and salpingo-pharyngeal folds.

Histologically these growths are made up of lymphoid tissue, i.e. groups of round cells in a small amount of connective tissue. The latter is much less than in the palatine tonsils, and hence allows the soft, formless adenoid tissue to assume more varied shapes, while it is softer and more vascular. The epithelium may change from the columnar to the squamous type, and the cilia may disappear.* Naso-pharyngeal adenoids are subject to acute (Plate, III., Fig. 3) or chronic inflammation. They may contain cysts (p. 318) or be invaded by keratosis (p. 382), syphilis (p. 625), or malignant growths (p. 417).

A process may take place in the clefts of the pharyngeal tonsil precisely similar to that occurring in the crypts of the palatine tonsil. Cheesy secretion is then met with, which on occasions becomes of a dirty brown colour, mortar-like consistency, and horribly fetid. It may get more or less encysted by a superficial inflammation of the ridges. In other cases the mucous glands become occluded, and retention cysts are formed.

Micro-organisms, mainly of pyococcal form, are often found superficially.

Symptoms.—These present a considerable range of variety, depending on the age and predisposition of the patient, the size, shape and changes taking place in the hypertrophy, and the capacity of the cavity in which it is lodged. They were very well described in the original paper by Hans Meyer.†

The symptoms may be considered as they produce (1) nasal obstruction, (2) secondary infections, (3) disturbance in secretion, (4) reflex symptoms, and (5) constitutional changes. These have been so fully considered in the chapter on Symptoms of Nasal Disease (p. 82), that they need only be briefly considered.

1. When present in the infant, the chief symptoms are those of nasal stenosis and its sequelæ (p. 82). Such infants are apt to suffer from convulsions, laryngismus stridulus, and vomiting. They are said by their mothers to “swallow their tongue,” or to “fight so for breath that one thinks they must choke in the night.” If not relieved, these infants must be fed with the spoon, otherwise they perish from inanition.

In children from about 3 years of age onwards a marked case

* McBride and Logan Turner, *Edin. Med. Journ.*, 1897, i.

† *Med.-Chir. Trans.*, London, 1868.

Fig. 1.—Adenoid growths, as seen in the postnasal mirror. (See p. 303.)

Fig. 2.—Retronasal phlegmon. Acute infection of adenoid remains in a patient aged 45.

Fig. 3.—Fibroma of the naso-pharynx, as seen by posterior rhinoscopy, in a boy aged 12. (See p. 320.)

(From Grünwald's "Atlas and Epitome of Diseases of the Mouth, Pharynx, and Nose.")

PLATE X.

CHAPTER XIX

TUMOURS OF THE NASO-PHARYNX

INNOCENT TUMOURS

NEITHER simple nor malignant neoplasms are found, except rarely, in the postnasal space. The innocent growths are so uncommon that every new formation in this region should be looked on with suspicion.

A papilloma has been met with as large even as a hen's egg.* Adenomata and cysts (chiefly in connexion with involuting adenoids) may occur.† They can generally be removed under cocaine, with a wire snare introduced through the nose, aided with the operator's left forefinger in the postnasal space, as in Fig. 71, p. 127. The postnasal forceps or adenoid curette will frequently be of service.

A simple fibroma is sometimes encountered hanging down in the postnasal space. It is really a nasal growth, and usually springs from the neighbourhood of the posterior end of the middle turbinal. It is removed under cocaine, with a wire snare introduced through the nose, aided with the forefinger in the postnasal space (*see* p. 124).

NASO-PHARYNGEAL POLYPUS

Synonym.—*Choanal polypus ; naso-antral polypus ; benign naso-pharyngeal polypus ; postnasal polypus.*

This simple growth is usually unilateral and solitary. It is classed here for clinical convenience, but it really originates in the maxillary sinus.

Etiology.—A single polypus in the naso-pharynx originates as a simple antral polypus. This in its growth passes into the nose through an accessory ostium maxillare—which Killian has sometimes found to

* D. Newman, *Proc. Laryngol. Soc., London*, v., 1898, p. 62.

† Jonathan Wright, "A Cyst of the Naso-Pharynx and a Cyst of the Oro-Pharynx," *N.Y. Med. Journ.*, Dec. 7, 1895.

Walter F. Chappell, "Four Unusual Tumours of the Naso-Pharynx," *Trans. Amer. Laryngol. Assoc.*, 1904, p. 217.

Richard H. Johnston, "Cysts of the Naso-Pharynx," *Annals of Otol.*, xvi., June, 1907, No. 2, p. 297.

this way the portion of the stalk situated inside the antrum is removed, and may be found to be 3 or 4 cm. long. It may show a groove of constriction, because a choanal polypus must in reality have the form of a constricted sac, of which one dilatation is in the antrum, and the other in the nose and naso-pharynx. This sac ruptures during extraction, and a large quantity of sanguineous serum escapes, while more will flow out, from the antrum, when the patient inclines his head forwards.

If it is found difficult to get the wire loop well round the growth, the latter should be steadied with the left forefinger in the post-nasal space, while a pair of polypus forceps is introduced through the nostril, so as to seize the pedicle and tear it away with a quick movement of avulsion.

No after-treatment beyond a simple cleansing alkaline lotion is required, but the condition of the antrum should be investigated, and it may be necessary to open it through the canine fossa, as described on p. 251. This may have to be done even although the sinus—as it may be in this affection—is quite clear on trans-illumination.

FIBROMA OF THE NASO-PHARYNX

Synonyms.—*Naso-pharyngeal polypus*; *fibroid tumour of the pharynx*; *fibroid tumour of the base of the skull*; *fibro-angioma of the naso-pharynx*; *retromaxillary polypus*; *juvenile sarcoma of the naso-pharynx* (Grünwald).

Definition.—These growths are histologically benign, but clinically malignant. They must be distinguished from tumours originating in the nose and passing into the naso-pharynx. They are comparatively uncommon in this country. Paget tells us that he never had an opportunity of examining these growths in a fresh state.* Delavan says they are certainly very rare.†

Situation.—The tumour may originate from any part of the fibrous tissue of the naso-pharynx—the basilar fibro-cartilage, the surface of the basi-sphenoid, the inner surface of the upper part of the internal pterygoid process, or the front of the bodies of the upper cervical vertebræ. They are also said to arise from the fibro-cartilage in the foramen lacerum medium, the petro-occipital suture, or the pterygo-maxillary fossa. The most common situation appears to be from the periosteum over the sphenoid bone, just behind the roof of the choanæ, and generally to one side. Escat has noticed that the majority of cases originate on

* "Lectures on Surgical Pathology," 3rd ed., p. 474. London, 1870.

† *Laryngoscope*, xiv., 1904, p. 44.

CHAPTER XX

POSTNASAL CATARRH

Synonym.—*Naso-pharyngeal catarrh.*

Postnasal catarrh is, in the majority of cases, only a symptom of disease in the nose or its accessory cavities. In certain instances it may simply be the participation of the postnasal space in catarrhal affections of the pharynx. But the affection may also be primary, and either acute or chronic.

Acute postnasal catarrh not only forms part of the invasion of acute coryza, but is frequently the first site of infection (p. 91). In acute sinusitis, particularly of the posterior group of cavities, the postnasal mucosa of the postnasal space is acutely inflamed. The condition subsides with the disappearance of the acute catarrh (Plate x., Fig. 2).

CHRONIC POSTNASAL CATARRH

Etiology.—The origin of catarrh in the postnasal space must first be sought in the nose and its accessory sinuses, and then in affections of the pharynx (Plate II., Fig. 3). Of pharyngeal causes, the one most likely to cause symptoms in the postnasal space is gastro-intestinal disorder. Dust, alcohol, and tobacco are the three most potent forces in causing or aggravating primary catarrh at the back of the nose, and it is possibly on account of their greater exposure to these agencies that men are so much more subject to the trouble than are women. In the postnasal space itself the catarrh generally originates from Luschka's tonsil. The adenoid collections which should have undergone normal involution at puberty are found to have only partially atrophied (Fig. 154, p. 294). They are seen still to exist in the form of a diffuse, rough, or ridged elevation in the dome of the cavity, secreting a tenacious muco-purulent discharge. This irregular surface is sometimes studded with small white patches, as in the lacunar infection of the palatine tonsils (p. 343); or the cysts which are met with in the pharyngeal tonsil may communicate with the surface and yield a particularly offensive and scabby

these are systematically treated (p. 280). Tornwaldt's affection, or any diseased remains of adenoids, should be carefully and completely removed.

In true postnasal catarrh the local and general treatment indicated in the chapters on Catarrh (p. 91), Chronic Rhinitis (p. 118), and Chronic Pharyngitis (p. 392) should be consulted. Locally it is most important to keep the region very clean by the use of simple, tepid, alkaline nose lotions (Formulæ 8 to 12). The secretion may be prevented from adhering by following the watery lotion with an oily spray (Formulæ 66 to 69). The mucosa of the space can be made healthier by swabbing it with Mandl's solution (Formula 71), glycerine and borax, boroglyceride, menthol (Formula 74), or resorcin (Formula 72). These paints are generally more successful than the astringents which are usually recommended, but an occasional application of nitrate of silver (gr. x-xxx to ʒi), or argyrol (25 per cent.), may prove useful.

General treatment will include attention to the causes already mentioned, as well as to those referred to in the chapter on Catarrh (p. 91). Climate seems less important than the manner of living. Dusty and overheated rooms, abuse of alcohol, tobacco, and the pleasures of the table, must be avoided.

The chronic essential form is frequently benefited by a course of treatment at Harrogate, Ems, Mont Dore, Cauterets, Aachen, Aix-les-Bains, or other suitable health resort.

Fig. 1.—Pharyngeal thrush. (See p. 382.)

Fig. 2.—Acute lacunar tonsillitis. (See p. 341.)

Fig. 3.—Mucous patches of the fauces and tongue. (See p. 629.)

Fig. 4.—Postsyphilitic defects and scars in the pharynx. (See p. 637.)

(From Grünwald's "Atlas and Epitome of Diseases of the Mouth, Pharynx, and Nose.")

PLATE XI.

CHAPTER XXII

DISEASES OF THE PALATINE TONSILS

Embryology and anatomy.—The tonsil is developed in the second cleft recess during the fourth month of foetal life. The faucial pillars represent portions of the 2nd and 3rd branchial arches. The hypoblastic recess opens into the pharynx as a funnel-shaped cavity, and terminates under cover of the soft palate as a narrow channel, which persists as the supratonsillar fossa. On the outer wall of this hypoblastic tube the tonsil is developed. The outlet of the tube is narrowed by two triangular folds of mucous membrane. One of these stretches across the angle formed by the junction of the pillars with the soft palate; this is known as the plica semilunaris. A second fold stretches backwards from the anterior pillar of the fauces, blending with the surface of the tonsil as it passes downwards, but with a free crescentic margin directed inwards and backwards; this is called the plica triangularis.*

This supratonsillar fossa exists in a large proportion of persistent tonsils, and may form a resting-place for foreign bodies or concretions. It is also a convenient cul-de-sac within which micro-organisms may become enclosed by tonsillar inflammation, leading to local or more generalized infection. It is certainly the site of the majority of quinsies (p. 370), and it is possibly one port of entry for tubercle bacilli.† It is unfortunate that this fossa should be called supratonsillar, for it lies within the capsule of the tonsil, surrounded by lymphoid tissue, and is never extratonsillar.‡ A better name would be "the tonsillar recess."

The tonsil is lodged in the tonsillar fossa. This triangular space lies between the anterior faucial pillar (containing the palatoglossus muscle) and the posterior pillar (containing the palatopharyngeus muscle). The floor or outer wall of the fossa is

* G. Seecombe Hett, *Lancet*, Feb. 13, 1909, p. 457.

† D. R. Paterson, "The Supratonsillar Fossa as the Starting-Point of Infection," *Laryngoscope*, v., 1899, p. 15.

‡ J. Hardie Neil, "Surgical Anatomy of the Tonsil," *Brit. Med. Journ.*, Oct. 10, 1909, p. 1139.

G. Seecombe Hett and H. G. Butterfield, "The Anatomy of the Palatine Tonsils," *Journ. of Anat. and Physiol.*, vol. xlv.

They originate in the crypts of the tonsils around filaments of the *Leptothrix buccalis*, and are made up of mucus, pus, epithelial cells, and phosphate and carbonate of lime and magnesia. There may be several calculi in the pocket which they make for themselves; the larger calculi are generally single. In consistence they may be soft and friable, or as hard as stone. When buried below the mucosa their surface is rough and granular. If a portion projects it may become smooth and polished.

Calculi are generally met with in the tonsils, and chiefly in the upper-anterior segment. Here they are apt to ulcerate through to the surface, and become lodged in the supratonsillar fossa, or in a ledge formed by adhesion of the tonsil and the anterior faucial pillar. From the supratonsillar fossa they may gain the soft palate. Smaller concretions may occur in the islands of lymphatic tissue on the posterior pharyngeal walls.

Symptoms.—Frequently there are no symptoms, and the calculus is discovered by accident. In other cases it may give rise to discomfort, aching in the throat, or pains shooting up to the ear, with recurrent attacks of tonsillitis. Or the concretion may give rise to suppuration and make its way to the surface, or set up a chronic abscess (Fig. 179).

The **diagnosis** is determined by the use of a probe or by digital examination.

Treatment.—These concretions can be cleared out, under cocaine, with a curette, or the small scoop which is generally found at one end of a grooved director. Larger ones may require incision, and enucleation with the finger. If the tonsil shows chronic lacunar tonsillitis, it will be best to remove tonsil and calculus together.

46). In small or fractious children the following should be given, undiluted :—

℞ Tinct. ferri chloridi ʒii
 Glycerini, ad ʒii
 ʒss every hour.

It is not disagreeable, and acts locally while we get the systemic effect.

It is doubtful if the external application of any medicament is of the slightest value, but warmth and support are undoubtedly comforting, and a patient generally prefers to have a warm fomentation, or a good mass of cotton-wool applied to the angle of the jaw and firmly secured by a silk handkerchief passing upwards over the vertex—not tied round the neck. This is more grateful than an ice-bag or a Leiter's coil.

Scarification of the tonsils is as useless as it is unscientific.

The patient must be given such nourishment as he can manage. He will often find it easier to swallow some semi-solid food—custard pudding, beef-tea well thickened with arrowroot, chicken purée, compôte of fruit, etc.—than liquids. Some pain in swallowing the latter will be spared him if he sucks them through a straw, and in this way he should be allowed to drink freely of lemonade, and of lemon squash in which the whites of eggs have been beaten up. These drinks are less cloying than milk, and leave a clearer sensation in the throat. Hovell suggests a method of diminishing the dysphagia. A nurse stands behind the head of the patient, and firmly applies the palms of the hands over the ears, and then behind the angles of the jaws. If she makes strong pressure at the moment that the bolus of food enters the pharynx the pain of its transit to the œsophagus will be considerably decreased.

As the disease diminishes, the treatment by salicylates should not be suddenly abandoned, particularly if there is any suspicion of its rheumatic nature. In the anæmic state which is often left, a most useful drug is the salicylate of iron (Formula 59). Change of air and rest, with nourishing diet, and such tonics as iron, quinine, or arsenic, will frequently be called for during convalescence. In children the compound syrup of the phosphates of iron, the syrup ferri iodidi, or the fresh saccharated carbonate of iron may be given.

Prevention.—In all cases a careful examination should be made to detect the cause of the disease, and, if possible, remove it. Any suspected sources of contagion should be avoided; special precautions and advice may be required if the rheumatic nature of the attack is manifest; and particular care should be given to the condition of the mouth, pharynx, and nose. The teeth and gums must be

CHAPTER XXIV

CHRONIC ENLARGEMENT OF THE TONSILS, INCLUDING CHRONIC FOLLICULAR TONSILLITIS

Synonyms. — *Hypertrophic tonsillitis; hyperplastic tonsillitis; chronic lacunar (or follicular) tonsillitis; chronic parenchymatous hyperplasia; chronic fibroid degeneration of the tonsils.*

In children there are always lymphoid glands between the pillars of the fauces. They are not necessarily pathological because they project somewhat. They are present from infancy, and tend to atrophy towards puberty; they are rare in adults, but sometimes persist throughout life. Many enlargements of the tonsils are purely inflammatory; others are hyperplastic and temporary, and not true hypertrophies. In some cases the hypertrophy appears to develop only towards puberty.

Seccombe Hett has classified palatine tonsils according to the following clinical types, namely: (1) the embedded tonsil (Fig. 178); (2) the projecting tonsil (Fig. 200, p. 415); (3) the flat tonsil (Fig. 179, p. 351); (4) the hanging tonsil (Fig. 181); (5) tonsils with preponderance of anterior, middle, or posterior masses, or of a combination of these (Plate XI., Fig. 2, p. 332); and (6) the tonsil with marked lingual prolongation.*

Etiology.—The precise causes of lymphoid hypertrophy are unknown. Formerly it was attributed to the “strumous” diathesis. The tendency to it appears to be hereditary, and enlarged tonsils “run in families.” Sex seems to have no influence, although in one family boys will be more affected, and in another girls. They have been attributed to mouth-breathing, so often are they met with in association with adenoids; but although they are doubtless aggravated by mouth-breathing, it is probable that the same causes are responsible for the lymphoid overgrowth in both the pharynx and the naso-pharynx. They are frequently a legacy of scarlatina, measles, diphtheria, whooping-cough, and smallpox, or repeated attacks of tonsillitis. As a rule they begin to enlarge about the age of 3 or 4, and hypertrophy does not commence after puberty.

Their frequency in school children varies from 33·4 per cent.† to

* *Journ. of Anat. and Physiol.*, vol. xlv.

† Leslie Thorne Thorne, *Brit. Med. Journ.*, April 9, 1904.

Symptoms.—The effects of enlarged tonsils are so well known that it will be sufficient to refer to them briefly. The tone of the voice is frequently thick and woolly, with a "tonsillar" ring about it which can be distinguished from that caused by nasal or laryngeal obstruction. Articulation is apt to be indistinct. The enlargement of tonsils usually takes place so gradually that, unless inflamed, patients are seldom conscious of their presence, although some may complain of the sensation as of a foreign body. Eustachian catarrh may be kept up by the interference with the action of the levator palati and salpingo-pharyngeus muscles. The presence of unhealthy tonsils appears to lead to changes in the teeth, while the reverse also holds good. The cervical glands are apt to be chronically enlarged. Indigestion is frequent, and gastric irritation is shown by the retching so easily produced when the throat is examined or simply opened for inspection.

Chronic or recurrent lacunar tonsillitis is frequent, and peritonsillitis may be associated with a small amount of tonsillar hypertrophy. The patient sometimes complains of foul breath, or the taste of "rotten stuff" in the mouth, or of being able to spit out masses of evil-tasting cheesy matter. The absorption of this material leads to systemic effects in the way of general ill-health—anaemia, languor, and general feebleness, occasional rises of temperature, or attacks of "glandular fever."

Cough is sometimes attributable to the presence of the tonsils, and various reflex symptoms have occasionally been traced to them. Enlarged tonsils are so frequently associated with naso-pharyngeal adenoids that it is sometimes difficult to say how many of the symptoms—mouth-breathing, snoring, shortness of breath, etc.—which formerly were generally attributed to the palatine tonsils are not principally caused by the naso-pharyngeal growth. Certain it is that the removal of the former glands mitigates the symptoms, whereas they more completely disappear when the adenoids are cleared away, although the faucial tonsils may remain.

In adults enlarged tonsils are apt to produce a degree of respiratory obstruction and venous stasis, conducive to varicose veins, emphysema, and hernia, and sometimes revealed by asphyxial symptoms when under ether.* This is one reason why chloroform by the "open method" is more suitable in tonsil cases.

We occasionally find children with enlarged tonsils who, at the moment of examination, apparently enjoy good health.

Examination.—The enlargement is generally more or less symmetrical. If one tonsil only is hypertrophied it should attract particular attention, unless there is a history of the other having

* H. Bellamy Gardner, *Lancet*, Sept. 30, 1905.

- ix. Arterio-sclerosis.
- x. Injury to the anterior faucial pillar.
- xi. The local use of cocaine and adrenalin, leading to secondary hæmorrhage.*

It will thus be seen that if the hæmorrhagic diathesis can be excluded the possibility of severe bleeding need not prevent the removal of diseased tonsils. Further security is obtained when patients are carefully prepared beforehand, and the precautions taken which are recommended to avoid bleeding in laryngological work.

The various methods employed for removing tonsils are described in the next chapter.

* Harmon Smith, *Laryngoscope*, xiv., 1904, p. 121. (Gives a full bibliography of alarming cases of hæmorrhage following tonsillotomy.)

CHAPTER XXVI

PERITONSILLAR ABSCESS

Synonym.—*Quinsy ; cynanche.*

Definition.—Many of the synonyms given in textbooks are incorrect and misleading. Thus, such terms as abscess of the tonsil, suppurating tonsillitis, phlegmonous tonsillitis, and angina tonsillaris imply that the disease is situated in the tonsil itself ; whereas, the condition so readily recognized as a quinsy is due to inflammation and the formation of pus in the tissues adjoining, but outside, the tonsil.

Etiology.—Peritonsillar abscess is rarely met with in childhood, or over 60 years of age. It is most common between 15 and 35. The statistics of Morell Mackenzie indicate that it is somewhat more common in males than in females, and is most frequent in the autumn and spring. There is said to be an hereditary predisposition to it.

Many writers (Bosworth, McBride, Bishop, Kyle, Ballenger, Shurly, Lennox Browne) look upon rheumatism as a frequent etiological factor, but the views on this subject have been somewhat obscured by confusing acute tonsillitis and quinsy in one description. The symptoms, which somewhat resemble rheumatic fever, can be equally well attributed to absorption from a septic focus ; and there seems no reason to regard a quinsy otherwise than as due to local septic infection. Infection appears to occur through the peritonsillar fossa, and adhesion between the tonsil and the plica semilunaris would account for the fact that quinsies generally occur in those who have repeatedly suffered from tonsillitis, and would also explain the tendency for them to recur in the same subject. There is no relation between the size of the tonsil and the occurrence of quinsy. An abscess more frequently occurs in association with small, irregular, unhealthy-looking tonsils ; and I have often met with it in patients in whom the tonsils had been removed level with the pillars of the fauces. In such cases, however, some tonsillar tissue is always to be found, generally adhering to the anterior pillar, and it is very common to find that the upper extremity of the gland has been left and obstructs the exit of the supratonsillar fossa. Among local predisposing causes are septic conditions of the mouth and teeth, suppuration in the nose or middle ear, and septic infection after operations on the nose. A subacute follicular tonsillitis often precedes an attack (p. 341).

A peritonsillar abscess occurs as a rare complication of diphtheria.*

* T. Hubbard, *Trans. Amer. Laryngol. Assoc.*, 1899, p. 69.

that in his long medical career he had never seen anyone die of a quinsy. In the majority of cases this is quite correct; but fatalities have occurred, chiefly in the external form of abscess. When both sides are attacked simultaneously the symptoms are naturally more distressing and alarming, but if the abscess is in the usual situation a good prognosis can be given. Œdema of the larynx is said to have occurred in adults, and a few cases of tracheotomy have been reported as necessary in young children. I have not met with instances of either. Death has been known to follow the spontaneous bursting of a large abscess and the flooding of the trachea, generally during sleep.*

Thrombosis of the internal jugular vein, with septic cervical cellulitis, may occur, even after an abscess has been evacuated.† Hæmorrhage from a quinsy may occur unexpectedly. Autopsies show that blood may come from the internal carotid, a branch of the external carotid, the palatine branch of the ascending pharyngeal, the lingual, or the inferior palatine branch of the facial. There are published records of 51 cases in which severe bleeding was associated with the opening of a quinsy; 23 recovered, and 28 died—a mortality of 54·8 per cent. The hæmorrhage may be primary or secondary. It may occur when an abscess opens spontaneously,‡ and is a good reason for incising the collection of pus in good time. Ligature of the internal carotid is generally required, but the dangers of this procedure are not to be underestimated. In the 51 published cases the common carotid was tied 16 times with 11 recoveries.§

Suppuration of the enlarged lymphatic glands is said to have occurred in rare instances. In those cases where deep suppuration in the neck, mediastinal complications, endocarditis, appendicitis, albuminuria, or other indications of general sepsis have occurred, they were probably due to the occurrence of suppuration external to the tonsil, or else to some form of septic pharyngitis (cf. p. 407). Amongst possible complications are septicæmia, broncho-pneumonia, thrombo-phlebitis, burrowing in the neck and pyæmia, suffocation from pressure (in children), secondary

* Morell Mackenzie, "Diseases of the Throat and Nose," vol. i., p. 54. London, 1889.

Hilton Fagge, "Principles and Practice of Medicine," 1st ed., vol. ii., p. 104. London.

A. Lyons, *Lancet*, Sept. 20, 1902.

F. de Havilland Hall, *ibid.*, Sept. 27, 1902.

Annual of the Universal Med. Sci., 1889, iv., E. 13.

† M. R. Ward, *N.Y. Med. Journ.*, Oct. 14, 1899.

‡ T. Bobone, *Bollettino delle Mal. dell' Orecchio*, 1905, No. 10.

§ James E. Newcomb, *Journ. of Laryngol.*, xxiii., 1908, No. 6, p. 289.

|| M. R. Ward, *Trans. Amer. Laryngol. Assoc.*, 1899, p. 60.

Jacques and Lucien, *Ann. des Mal. de l'Oreille*, xxxiv., ii., 1905, No. 12, p. 655.

there should be no hesitation in this in view of the painful and debilitating nature of the disease, the risks of secondary infection, and the possibility of death from hæmorrhage or the spontaneous bursting of the abscess. It can be done with a pair of sinus

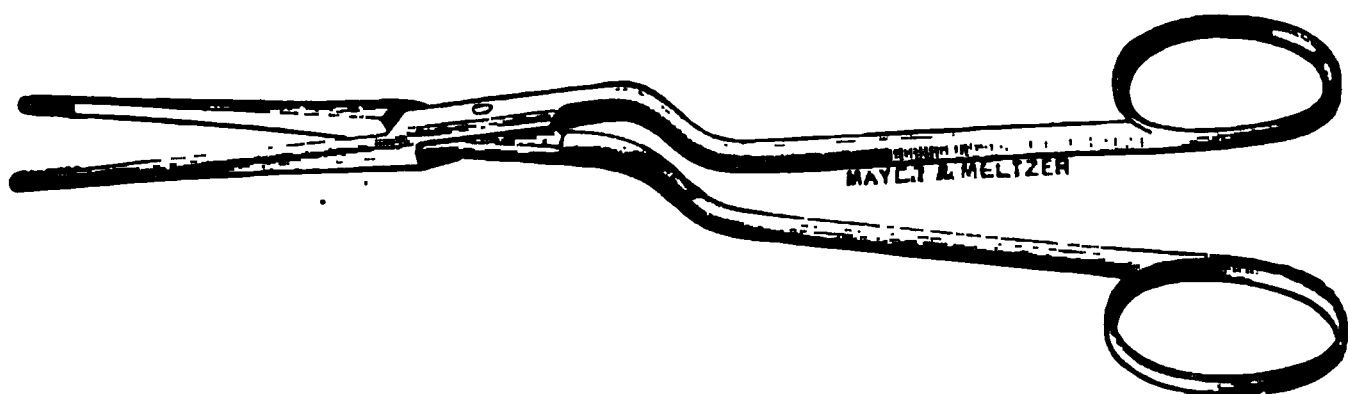


Fig. 194.—Bayonet-shaped, straight, sinus forceps. Used for opening peritonsillar abscess.

forceps (Fig. 194). The inflamed area is sprayed with cocaine and adrenalin, the patient's head supported, and the field of operation well illuminated. The abscess cavity will nearly always be found above and external to the tonsil, about the middle of a line

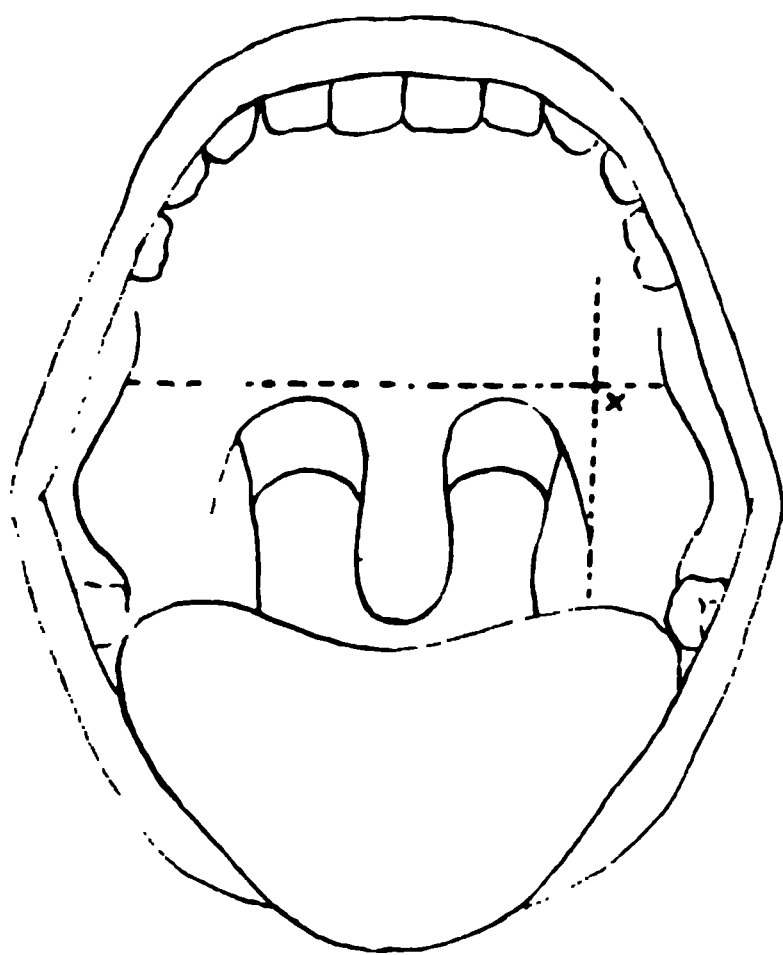


Fig. 195.—Semi-diagrammatic outline to indicate site for opening peritonsillar abscess.

drawn from the base of the uvula to the last upper molar tooth on the affected side.*

Another scheme for locating the purulent collection is the following: If an imaginary horizontal line be drawn through the base of the uvula, and another vertical one along the anterior faucial pillar, they will intersect above the tonsil (Fig. 195). One to two cm. external to this is the best point for opening the abscess. With the point of the forceps the region can be palpated. If it gives a firm, cartilage-like sensation, we should "tap" outwards until a boggy area is felt. With slightly increased pres-

sure the forceps are then pushed backwards and outwards till they enter the abscess, possibly at a depth of 2 cm. As they are withdrawn they should be widely separated, as in Hilton's method, so as to enlarge the opening and give free vent to a

* O. Chiari, *Wien. klin. Woch.*, 1889, No. 43.

CHAPTER XXVII

VINCENT'S ANGINA. MEMBRANOUS SORE THROAT. THRUSH. ANGINA ULCEROSA BENIGNA. KERATOSIS PHARYNGIS

VINCENT'S ANGINA

Synonyms.—*Diphtheroid angina* ; *ulcero-membranous tonsillitis* ; *chancriform tonsillitis* ; *ulcerating lacunar tonsillitis*.

Definition and etiology.—A subacute tonsillitis with slight general symptoms, characterized by ulcerative inflammation, and generally regarded as due to the symbiosis of the *Bacillus fusiformis* and a spirillum (the *Spirochæte denticola*).

The bacillus of Vincent is fusiform, pointed at the ends, and somewhat bulging in the middle. It is distinguished from the Klebs-Löffler bacillus by being broader and longer ; its length is 6 to 12 μ . The bacilli are frequently arranged in pairs, or in radiating bundles. They form vacuoles, do not stain with Weigert or Gram, but take up the ordinary basic stains such as fuchsin or methylene blue. The bacillus has very free movement. It can be cultivated on the ordinary media, to which human blood serum or ascitic or hydrocele fluid has been added (Hewlett).

The spirillum (*Spirochæte denticola*) is thin and long, does not stain by Gram, and does not take up fuchsin so readily as the bacillus, has free movements, but no flagellæ. Cover-glass preparations should be spread and stained while fresh. It has only been grown in pure culture under anaerobic conditions.*

Some observers point out that fusiform bacilli and spirilla can be found in any ulcerating affection of the mouth (syphilis, lupus, malignant disease, and gingivitis), and that, although they are constantly present and remarkably predominant in cases of Vincent's angina, it is at present sufficient to allow that the resistance in such cases is singularly modified in favour of these bacilli and spirochætes, and that the infectivity of the disorder has not been proved (M. Letulle).

This form of ulcerating tonsillitis is an uncommon disease and

* Muhlens and Hartmann, *Zeitschr. f. Hygiene*, 1906, p. 81.

the gums, and, rarely, the side of the pharynx. The destruction of tissue occurs three to four days after the onset of the disease. The surface involved may separate, leaving a deep excavation which heals up with slight cicatricial contraction. In the great majority of cases Vincent's angina is a unilateral affection.

It is very rare for the disease to invade the larynx* and trachea, or to prove fatal.†

Diagnosis.—Vincent's angina can readily be confused with diphtheria or tertiary syphilis. From the former it is distinguished by the milder constitutional symptoms, the limitation to one side, and the bacterioscopic examination. From syphilis the differentiation is more difficult, as both fusiform bacilli and spirilla may be found in a cover-glass preparation from a tertiary ulcer. In more than one case I have seen a suspected Vincent's angina reveal its true nature by the evolution of a coppery rash, or other specific stigmata.

Duration.—Most cases recover in seven to fourteen days, but they may relapse, and the condition has been known to persist for more than two months.

Prognosis.—Recovery is the rule, and complications in the glands, kidneys, or serous membranes are unknown (M. Letulle). Yet cases have been known to end fatally by extension to the larynx and lungs (Bruce).

Treatment.—Vincent recommends that the ulcerating surface be painted once or twice a day with pure tincture of iodine. It may first require cleansing with peroxide of hydrogen (5–10 vols. per cent.). If the ulceration continues to advance, powdered methylene blue may be applied on two successive days (J. D. Rolleston). Cleansing and disinfection of the mouth will be required, and rest, fresh air, and tonic treatment are important

* Reiche, *Munch. med. Woch.*, 1907, No. 17.

H. Arrowsmith, *Laryngoscope*, xx., 1910, No. 11, p. 1093.

† H. W. Bruce, *Lancet*, Oct. 12, 1907.

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 A. Raoult and G. Thiry, *Rev. Hebd. de Laryngol.*, xix., ii., 1898, No. 30, p. 881.
 H. W. Bruce, *Lancet*, July 16, 1904, p. 135. (Two cases ending fatally.)
 M. Letulle, *Presse Méd.*, 29 Déc., 1900, p. 411.
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 M. A. Arnold, *Journ. Roy. Inst. Pub. Health*, Nov., 1908.
 Raoult, *Rev. Hebd. de Laryngol.*, xxiii., 1902, No. 21, p. 629.
 Dopter, *ibid.*, xxiii., 1902, No. 39, p. 394.

THRUSH

The "white patches" produced by the growth of the *Oidium albicans* in the soft palate and fauces sometimes cause a quite unnecessary alarm by suggesting the possibilities of membranous sore throat or diphtheria. But the patches produced by this fungus are generally of milky whiteness, discrete, slightly raised, without any hyperæmic areola, and also are frequently found on the tongue and the mucous membrane of the mouth (Plate XI., Fig. 1). Thrush is most usually met with in poorly-fed and ill-tended children, where the milk supply is not carefully looked after, but it also occurs in adults who are cachectic or in indifferent health. The symptoms are simply local discomfort and slight dysphagia. Microscopical examination of a fragment, and a negative culture, will confirm the diagnosis. Some simple alkaline application—glycerin and boric acid, or borax and honey—will speedily clear up the condition (Formula 73).

ANGINA ULCEROSA BENIGNA

In this rare affection there is a solitary superficial ulceration on the upper part of one of the faucial pillars. It is shallow, with sharp edges, greyish in colour, but without any inflammatory areola. The neighbourhood may be normal, or slightly red and swollen. The ulcer causes little trouble beyond local discomfort and slight dysphagia, but it is of interest as it might be confused with a mucous patch.

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A. Brown Kelly, *Glasgow Hosp. Repts.*, 1899.

KERATOSIS PHARYNGIS

Synonyms.—*Pharyngomycosis leptothricia*; *hyperkeratosis lacunaris* (Siebenmann); *mycosis tonsillaris benigna* (B. Fränkel).

Definition.—Discrete, horny outgrowths of cornified epithelial cells, generally limited to Waldeyer's ring, producing insignificant local symptoms, and of variable duration.

Etiology.—Keratosis pharyngis commonly occurs between the ages of 15 and 40, but has been met with at 66, and is said to be more frequent in females.

Pathology.—Small projections are seen to originate from the bottom of the crypts of the palatine tonsils. They are grey, milky-white, yellowish, or chalk-like outgrowths. Some of them may be flat, filling up the crypt, like a millet seed; others may be yellowish

The duration of the condition is very variable. It may disappear in a few weeks, or recur, or persist for months or even years.

Five cases of keratosis laryngis have been recorded by Logan Turner and others.* The vocal cords, and sometimes the adjoining ventricular bands, presented an irregular mammillary or spiculated appearance. The colour varied from snow-white to greenish-white. In these cases the mucosa of the larynx was reddened, and there was pain and hoarseness.

Symptoms.—Keratosis pharyngis is frequently discovered quite accidentally. Some patients complain of local uneasiness, irritation, soreness, dryness, or cough. There are no general symptoms. But, until the diagnosis is made, they are apt to be alarmed at a condition which they are easily able to inspect for themselves. They can be assured that it is unconnected with defective drains or other insanitary surroundings. It has a slow evolution, and may disappear spontaneously.

Diagnosis.—The affection is frequently mistaken for chronic lacunar tonsillitis, but in the latter the cheesy collections are yellowish-white, amorphous, and easily extruded from the crypts. In keratosis some horny projections can nearly always be seen on the lingual and pharyngeal, as well as on the palatine tonsils. From diphtheria it is readily distinguished by the absence of fever, enlarged glands, general symptoms, or the Klebs-Löffler bacillus.

Treatment.—This must be directed to the general health, and a relaxation of work or change of air will sometimes be followed by spontaneous recovery. In some cases the horny growths evidently cause not only anxiety, but much local discomfort, as patients are able to tell from their sensations if all the points have not been removed or if there is any recurrence.

The ordinary antiseptic or astringent applications are useless. Chromic acid fused on a probe, chloride of zinc, and salicylic acid may all fail to eradicate the growths. Such measures may come in usefully after the masses have been well scraped away with a curette, and their site of origin treated with the galvano-cautery.

* O. Chiari, *Prag. med. Woch.*, March 1, 1895.
Price Brown, *Canadian Practitioner*, July, 1897, p. 482.
Logan Turner, *Edin. Med. Journ.*, April, 1906, p. 344.

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A. Brown Kelly, *Glasgow Med. Journ.*, 1896.
Max Toeplitz, *N.Y. Med. Journ.*, June 25, 1898.
George B. Wood, *Trans. Amer. Laryngol. Assoc.*, 28th Congress, 1906, p. 194.

but it is only slight and never serious. In any case, these veins rarely call for local treatment, and should never be touched until general treatment and mild local measures are exhausted.

CHRONIC LINGUAL TONSILLITIS

The lingual tonsil may undergo chronic hypertrophy, and be sufficiently prominent to be visible even by direct inspection, aided only by a tongue-depressor.

Symptoms.—There are local symptoms of discomfort, irritation, catarrh, hawking, sensation of a foreign body, unnecessary swallowing movements, cough, and interference with the voice. The size of the hypertrophy bears no proportion to the symptoms, of which many are neuropathic.

Examination.—The hypertrophy may be unilateral or bilateral. The enlargement of the lingual tonsil may touch, or more or less conceal the epiglottis, or it may extend outwards towards the anterior pillar until it becomes continuous with the palatine tonsil. The condition generally remains stationary, with occasional exacerbations. The enlargement usually disappears with age, but decided hypertrophies have been found in men of 60 (Moure).

Pathology.—The researches of Swain and Brindel show a complete resemblance to the changes found in the buccal tonsils.

Treatment.—Care of the teeth and gums, regulation of the diet, moderation or abstinence in tobacco and alcohol, and attention to indigestion and constipation, will frequently relieve all symptoms. If the lingual tonsils still continue to cause irritation, they should be cleansed with an alkaline spray (Formula 9), followed by a carbolic, menthol, krameria, or other antiseptic or astringent lozenge. They may require a resorcin pigment (Formula 72), or painting with Mandl's solution (Formula 71), chloride of zinc (gr. x to ʒi), nitrate of silver (gr. xx to ʒi), or sulphate of copper. If this treatment is not successful, the enlarged gland might be reduced with the galvano-cautery, or removed with punch-forceps or a lingual tonsillotome.

ACUTE LINGUAL TONSILLITIS. ABSCESS OF THE LINGUAL TONSIL. LINGUAL QUINSY

Etiology.—Acute inflammation of the lingual tonsil may be produced by the same causes which are productive of ordinary tonsillitis (cf. p. 341). In addition, erosion from a foreign body and the galvano-cautery have been regarded as etiological factors when the base of the tongue is concerned.

Symptoms.—These are very similar. One-sided dysphagia is the

it may be encapsuled or free; and in size it varies from a nut to a Tangerine orange. The symptoms are simply mechanical ones—chiefly of obstruction. The glands are not enlarged.

Removal can generally be effected through the mouth by a wire snare, morcellement, or a lingual guillotine. Should an external operation be required, the best is transhyoid pharyngotomy, after a preliminary laryngotomy (cf. p. 720). It is not a bloody operation, and gives free access to the region of the epiglottis and the base of the tongue. The tumour should be enucleated, the operator keeping outside, but close to the real capsule of the growth. Before undertaking the operation the presence of the thyroid gland should be carefully determined, otherwise myxœdema might ensue unless a fragment of the lingual goitre were purposely left behind.

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- Many cases of abscess are recorded by—*
 Seifert, *Arch. f. Laryngol.*, i., 1893, p. 48.
 Simonowski, *Internat. Centralbl. f. Laryngol.*, Juli, 1894, S. 24.

Pathology.—The disease presents the usual type of an acute exudative inflammation on a mucous surface, and so offers the stages of congestion, swelling, dryness, increased secretion, and then resolution. The hyperæmia and small-celled infiltration are associated with diminished secretion. This is followed by a free secretion, at first greyish and viscid, and later muco-purulent. The epithelium is shed from a thick velvety surface, and a subacute condition is often left behind.

Symptoms.—Acute pharyngitis is generally ushered in rather suddenly by dryness and discomfort in the throat. The pain varies from a simple feeling of irritation, a desire to hem and hawk, the sensation as of a hair or foreign body, up to that of acute dysphagia when swallowing appears impossible and the mere deglutition of saliva is an agony. There may be a slight chill, with a temperature of 100° to 102° . General malaise and headache are constant. The neck feels sore, and is often held stiffly. If the uvula is affected, the voice becomes nasal, swallowing becomes more difficult, and ingested fluids may regurgitate through the nostrils. In proportion to the degree of inflammation in the tonsillar region will be the pain and tenderness at the angle of the jaw. The voice is apt to be thick and woolly from the accumulation of mucus in the laryngo-pharynx, though the symptoms of inflammation in the larynx as well as in the nose are often super-added, and the catarrhal process may spread to the Eustachian tubes, giving rise to temporary deafness. The tongue is generally furred and the breath foul, and there are thirst, anorexia, and constipation.

Examination.—The patient has not the same difficulty in opening the mouth as in acute tonsillitis. With a tongue-depressor the pharynx is seen to be red and swollen, the general lumen of the tube somewhat diminished, and the secretion increased. The colour is generally a deep purple-red, and this, as well as the swelling, may be more marked in some parts than in others. The posterior wall does not always show the most change. The lateral walls are frequently deeply congested, and bulge inwards in rounded folds so as to give the appearance of a second posterior faucial pillar. The fauces, soft palate, and tonsils are frequently implicated, and the uvula may be swollen, rounded, dusky purple, and œdematous-looking, so that it hangs down limply like a semi-translucent sausage. It is this condition which accounts for the patient's complaints of the sensation of a foreign body in the throat, as well as the tickling and cough which are often worse when he lies down. This parietic condition of the uvula and soft palate interferes with the swallowing or expectoration of the thick, tenacious mucus which hangs about.

secretion, forming what has been called "folliculous pharyngitis." The bands seen in lateral pharyngitis are by some considered to be similar lymphoid collections, by others they are regarded as chiefly formed by hyperplasia of the submucous connective tissue, while some attribute them to muscular hypertrophy in the salpingo-pharyngeal folds.

Symptoms.—There is no necessary connexion between the subjective symptoms of pharyngitis and the pathological changes found. The converse of this statement is equally true, for many individuals may present all the physical signs of pharyngitis and yet be entirely free from discomfort or disturbance. Not only are many ardent smokers quite unaware of their throats until some accidental inspection reveals a well-marked hypertrophic pharyngitis, but I have known some of the best operatic artists who were quite undisturbed by a similar condition. We must also bear in mind that the pharynx is frequently charged with crimes of which it is entirely innocent, partly because many discomforts originating in other parts of the air-tract are referred by patients to this area, and partly because inspection of it is so easy.

The symptoms complained of are very variable, both in character and in intensity. Discomfort in the throat is the most usual one, and is described as a mere consciousness of it, or as being sore, aching, full, or giving the sensation of a hair, lump, or some other foreign body. There is much hemming, hawking, or gagging, which the patient states is to clear the throat, although there is seldom any marked increase in the amount of secretion. There may be a frequent desire to swallow, with some pain in doing so, although there is never real dysphagia. Pain may be referred to the ears. A hacking, rasping, or scraping cough is often super-added—what in some cases is called a "stomach" cough. It may be of the most hollow, resounding, and alarming tone, or it may be a stuffy and ineffectual cough, which gives rise to attacks of laryngeal spasm (cf. p. 507). The voice is often impaired, being hollow and weak, and without resonance, or what teachers describe as "colorito." This is particularly the case with clergymen and other professional voice-users. They appear to have to speak with much care, frequently pausing to clear the throat or swallow a little mucus. The voice may be bitonal, and is apt to "crack" or drop suddenly to a whisper. Continued attempts at speaking may end in a feeling of cramp or spasm, which the patient instinctively tries to check by grasping his throat with his hand. The symptoms of chronic laryngitis are frequently present, and dyspeptic complaints are common. The spread of catarrh to the Eustachian tubes may be indicated by a slight and varying deafness.

nitrate of silver should be avoided, from the possibility of producing permanent staining of the skin (argyria). Benefit will frequently be obtained by the topical use of iodine in the form known as pigmentum Mandl, and this has the advantage that it can be applied by the patient himself, every day if necessary, after alkaline cleansing of the pharynx (Formula 29).

The centre of the follicle may be punctured or scratched with the tip of a bistoury or sharp-pointed pair of scissors, or it may be touched with a glass rod of which the tip has been just moistened with dilute hydrochloric acid, trichloroacetic acid, or pure carbolic acid. Nitrate of silver or chromic acid fused on a probe, or a 20 per cent. solution of chromic acid on cotton-wool, may be employed. Before making any of these applications the surface should be mopped as dry as possible, to prevent the corrosive action of the caustic from spreading.

Finally, I come to the use of the galvano-cautery, which is too often the first remedy thought of, instead of being the last. Many cures are undoubtedly obtained by it, but it is quite possible that this is to some extent owing (*a*) to the rest to the pharynx and larynx which goes with the treatment, (*b*) to reflex action on the larynx, or (*c*) to the mental impression on the patient. Many of these patients come with the specific request to "have the throat burnt," either because some friend has recommended it, or because they have previously by its means been relieved of a granular pharyngitis, and therefore hold that the galvano-cautery is the remedy for all throat troubles. The cautery is often recommended to "destroy the granulations," and it may do this so effectually that, by destroying the mucous and lymph-glands, a condition of atrophic pharyngitis is induced! Fortunately the reserve of lymphoid tissue is so plentiful that fresh masses generally hypertrophy to replace those destroyed. The galvano-cautery should be used on the same principle as other caustics already mentioned, namely, as a destroyer of diseased tissue, and for its constringing action in producing scar tissue (cf. p. 62). Anyone used to making the application will be able to pass the point into two, three, or four follicles before withdrawing the instrument from the mouth. These applications should only be made at one sitting to part of the granulations—say to those on one side of the middle line—and at least a week to ten days should elapse before the others are similarly treated. In the interval, while the eschar is separating, the patient should continue the use of an alkaline spray, while the pharynx can be soothed and kept clean by a menthol lozenge. A little orthoform powder can be puffed on to the cauterized surface, and the patient advised to avoid exposure to vitiated or septic air,

part of the swelling, and the opening enlarged in the long axis of the body. The pus will pour out through the nose and mouth. The practitioner may feel more security if, with the same precautions and with the patient in the same position, he first aspirates the pus cavity. The after-care of the patient will require consideration, since the disease is generally met with in the feeble and ill-nourished.

When the abscess points towards the neck, it must be opened through an external incision. This is made along the posterior border of the sterno-mastoid muscle, and the dissection is carried behind the large vessels of the neck and in front of the prevertebral muscles. The external operation, which leaves a certain scar, is reserved for some rare cases, as when the abscess is too low to be easily reached through the mouth, when spasm of the masseters cannot be overcome, when a large pulsating vessel is noticed in front of the abscess, or when the abscess is more lateral than central.

No gag should be employed, a tongue-depressor or the operator's left forefinger being sufficient both to keep the mouth open and to act as a guide.

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 Vere Pearson, *Lancet*, Oct. 26, 1901.
 V. Texier, *Rev. Hebd. de Laryngol.*, xxiv., i., 1904, No. 7, p. 177.
 E. L. Meierhof, *Laryngoscope*, xv., 1905, No. 6, p. 467.
 M. A. Goldstein, *ibid.*, xviii., 1908, No. 1, p. 46.

or even through intact epithelium. In some cases of angina Ludovici infection has apparently reached the submaxillary region through a carious tooth. It may extend from the glands in acute exanthemata—chiefly scarlatina and measles—and it has been attributed to traumatism. At times it has appeared to be epidemic. Uncooked milk has been suspected of conveying it.*

Pathology.—This varies very much with the location of the affection, the depth to which it has travelled, and the virulence of the process. The surface changes may be slight, and yet the inflammation may have extended through the submucous tissues, enveloping the entrance of the larynx, extending along the trachea and œsophagus, burrowing below the cervical fascia in the neck, and spreading to the lungs. It is impossible to separate the purely local from the more diffuse infiltrations, or the simply serous exudate from that which is purulent or even gangrenous. The affection may be limited to the pharynx, but it tends to spread to the larynx, and, less commonly, to the naso-pharynx. On the other hand, the larynx may show very marked œdema and the pharynx be but slightly affected. No characteristic change is found in the nose, but as the infection of facial erysipelas very frequently starts from the nares, it is possible that the disease under consideration may also be inoculated there.

Symptoms.—These depend upon the type, for we are now studying in one group the hospital sore throat, which may run a mild course of several days, and the acute septic infection, which may cause death in twelve hours. It has been suggested that five degrees of septic inflammation may be recognized clinically (Watson Williams)—(1) *superficial septic inflammation*, e.g. the so-called hospital sore throat; (2) *membranous septic inflammation*, e.g. some cases of pseudo-diphtheria and scarlatinal diphtheria; (3) *œdematous inflammation*, e.g. acute œdematous tonsillitis, uvulitis, pharyngitis, epiglottiditis, arytenoiditis, and cellulitis of the tissues of the neck; (4) *phlegmonous or suppurative cellulitis*; (5) *gangrenous inflammation*.

The invasion may be attended with general malaise, headache, slight feverishness, and some sore throat. Or the onset may be abrupt, being marked by a rigor, with great and sudden prostration, while little complaint may be made of the throat itself. In either case one type may change into the other. The temperature may, even in the acute form, never rise above 99° F., and may remain subnormal. In other cases it rises to 102° or 106°, and chills and rigors are succeeded by profuse perspiration. The pulse at first is full and bounding, but later becomes small, feeble, and

* Gifford Nash, *Lancet*, Oct. 18, 1902.

diseases of the larynx, but clinically it is more practical to consider it with other acute septic diseases of the throat.

The disease may be secondary to acute inflammation of the tonsils, pharynx, or lingual tonsil, or primary, and caused by septic infection, the swallowing of irritant fluids or substances, or the inhalation of pungent vapours. The symptoms come on suddenly with pain, dysphagia, attacks of choking and coughing on attempting to swallow, dyspnœa, fever, anxiety, and prostration.

The epiglottis is seen to be intensely inflamed, of uniform bright-red colour, swollen, and, later on, œdematous. The rest of the larynx, if visible, is generally normal.

Treatment, in addition to that generally recommended, should consist in the application of ice, the use of a spray of adrenalin chloride, and scarification which may set free foul-smelling, sanious pus. Tracheotomy may be necessary.

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GANGRENE OF THE TONSILS

Definition.—A microbic infection of the pharynx, of a serious nature, and allied to the acute infectious phlegmon of the pharynx (p. 407). The pharynx, tonsils, and soft palate are generally attacked at the same time.

Etiology.—Gangrene is a rare development of the anginae complicating scarlatina, diphtheria, measles, smallpox, enteric, or erysipelas, and in these cases is generally met with in children. It occurs in severe types of tertiary syphilis. It is also found as a primary affection in adults who are debilitated, cachectic, or dirty, and may supervene on various ulcers in the mouth. Large vessels may be invaded by its spread, and it may be accompanied by hæmorrhage into the lungs, bowels, or kidneys.

Symptoms.—These may be sudden—pain, rigors, and fever; or they may be slow and insidious—malaise, wasting, feebleness, coated tongue, diarrhœa. There are fetor and discharge from the mouth, dysphagia, and possibly regurgitation through the nose.

Examination.—At first the fauces are inflamed and swollen, and the uvula œdematous. Then patches, ulcers, sloughs, and localized gangrene are found on the tonsils. The glands at the angle of the jaw are enlarged and very tender. The temperature may not be raised, or may fall below normal. Albumin may appear in the urine, and petechiæ on the skin. The pulse fails; the extremities

CHAPTER XXXI

TUMOURS OF THE PHARYNX. HÆMORRHAGE FROM THE THROAT

INNOCENT GROWTHS

THERE is a general belief that benign tumours on the tonsil are practically non-existent. But papillomata are not uncommon, and, although rare, other forms of innocent growths are occasionally met with.

The following will be referred to, viz.: papilloma, adenoma, fibroma, lipoma, angioma, dermoid cysts, mixed tumours, and cysts.

Papillomata are not uncommonly met with on the soft palate and uvula, the pillars of the fauces, and the surface of the tonsil, where they grow out of a lacuna or from the plica triangularis* (Fig. 176, p. 336). They are irregular in shape, resembling little white warty fingers, or small white or grey papillated masses. Sometimes they are pale pink, or resemble a red polypus.† They may be sessile or pedunculated, and vary in size from a millet-seed to a hazel-nut. Sessile and pedunculated papillomata may be found in the same patient.‡ They consist of a fibro-vascular core, covered with the fimbriæ of stratified epithelium.§

Adenoma occurs as a smooth or irregularly rounded growth, firm and sessile, and greyish or pinkish. It may be pedunculated, and can then only be diagnosed by the microscope. The usual sites for it are the palate, the sides of the uvula, and the tonsils.||

Fibromata are rare in the pharynx, and are to be distinguished from the fibromata growing from the naso-pharynx (cf. p. 320). They are smooth, hard, and sessile, but they may become lobulated and pedunculated. They occur in the tonsils and neighbouring velum and palatine arches, but are also found beneath an intact mucosa, growing from the pharyngeal aponeurosis, and as large as a hen's egg¶ (Fig. 200).

* D. R. Paterson, *Proc. Laryngol. Soc., London*, v., Feb. 5, 1898, p. 44.

† W. Hill, H. T. Butlin, Jobson Horne, and M. Yearsley, *ibid.*, v., 1897, p.

‡ H. Sharman, *ibid.*, v., May, 1898, p. 86.

§ Wyatt Wingrave, *ibid.*, v., Dec., 1897, p. 17.

Wyatt Wingrave, *Journ. of Laryngol.*, viii., 1894, No. 6, p. 358.

|| Tanturri, *Arch. Ital. di Laringol.*, xxii., Aprile, 1902, p. 69.

¶ N. B. Odgers, *Brit. Med. Journ.*, May 25, 1907, p. 1236.

For purposes of both prognosis and treatment it is desirable to be able to differentiate a carcinoma from a sarcoma. In the former we find a hard, bluish-pink growth, with inflamed areola, irregular surface, infiltration, interference with the movements of the lower jaw, and early affection of glands; hæmorrhage occurs earlier from an ulcerating and fungating surface; spontaneous pain is an early symptom. A sarcoma is smooth and soft, and looks pale-pink or even yellow below an intact mucosa. The microscope may show the difference, if a good piece of growth can be obtained.

Prognosis.—In carcinoma this is very grave. The progress may appear slow before ulceration occurs, but then it advances rapidly, so that a case may terminate fatally in six to eighteen months. In the case of sarcoma the outlook is more hopeful, as it remains localized for some time, and progress is sometimes slow, extending over twelve or more years. Even recurrences can be dealt with more satisfactorily. Death may occur from cachexia, inanition, hæmorrhage, suffocation, or intercurrent disease. Cases of carcinoma have been operated on, and had no recurrence six years after operation.*

Treatment.—This is guided by the situation, extent, and nature of the growth.† Epithelioma, which does not often come under observation until the glands are considerably invaded, is rarely operable. Sarcoma may go on for years without ulceration or pain, so that the progress of a case and the age of the patient must be taken into consideration. In any case a sarcoma holds out more promise of a successful removal, for the reasons already mentioned.

When the growth is extensive, invading not only the tonsil, but also the base of the tongue, or the side of the larynx, or the lower pharynx, it is not likely to be suitable for operation. The most promising cases are those where the disease is more or less limited to the tonsillar region. Here a malignant growth can be operated on (*a*) through the mouth, (*b*) from the side of the neck, or (*c*) by a combination of the two methods.

As free hæmorrhage is always possible, it is advisable to perform a preliminary laryngotomy, and plug the laryngo-pharynx with a sponge (cf. p. 77). The tonsil can be enucleated by dissection (see p. 364), and the growth, with a sufficient margin of healthy tissue, can then be clipped away with blunt-pointed scissors curved on the flat. If the growth is larger, more access to it can be obtained by slitting the cheek backwards from the angle of the mouth to the ramus of the jaw.

* David Newman, *Brit. Med. Journ.*, Jan. 2, 1887.

† A. Castex, *Bull. de Laryngol.*, xii. 1^{re}, 1 Oct., 1892, p. 242.

HÆMORRHAGE FROM THE THROAT

(HÆMOPTYSIS NOT OF PULMONARY ORIGIN)

The laryngologist is not infrequently asked if he can find in the throat the source of origin of expectorated blood. But, as a matter of fact, hæmorrhage from the throat is rare, and is, as a rule, only secondary to some serious local affection. Otherwise, the blood, with few exceptions, comes from the lungs. This source is often overlooked, as the misconception is general that blood from the lungs must be coughed up, or be frothy from admixture of mucus, or be accompanied by physical signs in the chest. But in the early stages of pulmonary tuberculosis there is no catarrh or mucus to become mixed with the blood, and no cough, so that pure blood from the lungs may cause no symptoms until it is simply hawked or cleared out of the pharynx.

The other sources of hæmoptysis can be tabulated as follows :—

1. Epistaxis (p. 100), when the blood flows backwards.
2. Adenoids.
3. Enlarged veins in the pharynx, and around the base of the tongue, especially in gout, cirrhosis of the liver, and influenza.
4. Suppuration and ulceration in connexion with malignant disease, syphilis, peritonsillar abscess, and (rarely) lupus or tuberculosis.
5. Spongy gums.
6. Multiple telangiectases.
7. Vicarious menstruation.
8. Trauma from accidental injury, the passage of instruments, rupture of veins by vomiting, or surgical operation.
9. Laryngeal hæmorrhage, especially in the acute laryngitis of influenza.
10. From the trachea—varicose veins, congestion from pressure of enlarged thyroid gland, or of an aneurysm.*
11. Various blood conditions—purpura, scurvy, pernicious anæmia, leukæmia, hæmophilia, mercurial stomatitis, phosphorus-poisoning, cirrhosis of the kidneys or liver, and certain acute fevers, especially enteric and yellow fever, hæmorrhagic smallpox, and influenza.†

Gout, according to Semon and Watson Williams, is, comparatively speaking, the most fertile source of pharyngeal hæmorrhage.

Bleeding from the surface of the laryngeal mucous membrane

* F. Massei, *Arch. Ital. di Laringol.*, Ottobre, 1898.
Pisenti, *ibid.*, Luglio, 1899.

† James E. Newcomb, *Trans. Amer. Laryngol. Assoc.*, 26th Congress, 1906, p. 251.

CHAPTER XXXII

NEUROSES OF THE PHARYNX

Innervation.—The soft palate, uvula, the levator palati and pharyngeal constrictors, according to Horsley and Beevor, are innervated by spinal accessory fibres in the pharyngeal plexus, and do not derive their nerve supply from the vagus. Later observers claim that the pneumogastric is the sole motor nerve of the palate.* The soft palate is not supplied from the facial nerve, as was once thought.

Varieties.—The neuroses of the pharynx may be considered as they are (A) motor, or (B) sensory.

A. MOTOR NEUROSES

These are either (a) paralytic, or (b) spasmodic.

(a) *Paralytic Neuroses*

Paralysis of the soft palate, and, more rarely, of the constrictors of the pharynx, may be due to—

1. Neuritis after diphtheria, which is the most common cause. Neuritis attributable to influenza, lead-poisoning, other membranous exudations, or even acute lacunar tonsillitis, is said to occur, but it must be a rare event.

2. Implication of the nerve-roots between their emergence from the side of the bulb and their exit from the cranium through the jugular foramen—chiefly caused by meningitis (syphilitic) and malignant affections of the basis cranii. Pressure in the neck on the branch of the vagus before the pharyngeal branches are given off may be due to malignant, tubercular, or other growths.

3. Bulbar lesions: chronic bulbar paralysis (glosso-labio-laryngeal paralysis); bulbar apoplexy or embolism; tumours pressing on the bulb; tabes dorsalis; syringo-myelia of the bulb (syringobulbia).†

4. Upper motor segment lesions, such as severe cases of apo-

* L. Réthi, *Arch. Internat. de Laryngol.*, xxviii., 1909, No. 6, p. 905.

† Jobson Horne, *Proc. Laryngol. Soc., London*, iv., Jan., 1897, p. 104.
H. Tilley, *ibid.*, vi., Dec., 1898, p. 21.

Duration and prognosis will, of course, depend on the cause. In most central lesions the paralysis is permanent and of serious import.* When due to diphtheritic or other neuritis it may last weeks or months, but generally gets well. One side may recover before the other, so that the case then simulates a unilateral paralysis of the palate.

Treatment.—The general treatment will be directed by recognition of the cause. In most central nerve-lesions it is of little avail. Syphilitic cases or operable growths are more hopeful. If caused by diphtheria or influenza it is usual to give tonics of strychnine and iron. Hysterical cases should be treated by suggestion and on the lines proposed in functional aphonia (p. 512). Toxic (diphtheria, influenza) and functional cases are helped by gargling, humming, and various vocal exercises. The faradic current can be used either externally or internally.† Paralysis of the pharyngeal constrictors may necessitate the use of the stomach-tube.

(b) *Spasmodic Neuroses*

Spasm of the pharynx may be (1) tonic, or (2) clonic.

1. Tonic spasm of the pharynx occurs in hydrophobia and tetanus; tumours pressing on the bulb; locomotor ataxy; acute local affections, such as acute tonsillitis; and functional disorders, usually hysteria (globus hystericus).

Apart from the terrible manifestations in hydrophobia and tetanus, pharyngeal spasm is almost always of functional origin.

2. Clonic spasm or nystagmus of the pharynx may be met with (i) in organic disease of the brain, chiefly of the pons or cerebellum, or (ii) as a reflex neurosis.

In clonic spasm, contractions may recur at the rate of 60 to 160 times per minute, or even increase up to 240 per minute,‡ and be accompanied by an audible clicking sound.§ The movements may affect the soft palate and posterior pharyngeal wall, and be associated with synchronous twitchings of the arytenoids, or rapid movements of adduction in the vocal cords. Only one

* Charles L. Beevor, *Clin. Journ.*, Oct. 7, 1896.

† W. Aldren Turner, *Laryngoscope*, v., July, 1898, p. 33.

‡ L. N. Pegler, *Proc. Laryngol. Soc., London*, x., April, 1903, p. 106.

§ G. A. Garry Simpson, *Med. Press*, Nov. 23, 1904, p. 547.

J. W. Bond, *Proc. Laryngol. Soc., London*, iii., Jan., 1896, p. 41.

H. L. Lack, *ibid.*, v., Jan., 1898, p. 38.

H. L. Lack, *Laryngoscope*, June, 1898.

F. Semon, *Proc. Laryngol. Soc., London*, viii., Jan., 1901, p. 49.

F. J. Steward, *ibid.*, x., March, 1903, p. 84.

L. H. Pegler, *ibid.*, x., April, 1903, p. 105.

F. Semon, *ibid.*, xii., Jan., 1905, p. 38.

Sinnhuber, *Ann. des Mal. de l'Oreille*, 1906, ii., No. 7, p. 91.

hyperæsthesia and paræsthesia of the pharynx. They are frequently very depressed mentally.*

Examination.—The upper air-passages should be carefully examined to make sure that there is no direct or reflex source of irritation. Latent lesions in the nose are not infrequently overlooked, and affections of the lingual tonsil may escape notice. The search for reflex sources of irritation may have to be directed to the ear, for cerumen or foreign body; to the eye, for refractive errors; and to the teeth, the gastro-intestinal tract, and the pelvic organs, as well as the heart, lungs, and kidneys.

Diagnosis is arrived at by a process of exclusion. It is important not to overlook early tuberculosis, commencing malignant disease, or the anæmia frequently associated with a fibroid tumour or other uterine affection. While not neglecting any possible cause, we must guard against attributing the symptoms to some trifling local condition. If undue regard is given to some slight granular pharyngitis or tonsillar irregularity, the patient's attention is only too likely to be increasingly concentrated on the throat.

Treatment.—When the sensory neurosis is clearly functional, general treatment is of primary importance, and should be directed to the habits, hygiene, digestion, or uterine and other functions. Rest or exercise, change of scene or seclusion, the simple life or a little excitement, will be advised according to the condition of the patient. In any case his confidence must be won, so that, by suggestion, he may feel assured that his sensations can be neglected. Nervine tonics, iron, arsenic, phosphates, stomachics, or bromides will be called for under different circumstances.

Local treatment should be avoided altogether, if possible. Certainly the free use of the galvanic or other cautery, and the prescribing of such anodynes as cocaine or morphia, are worse than useless. If some local application is inevitable, the most suitable are lozenges, or sprays, containing menthol, resorcin, carbolic acid, or antipyrin. They diminish the local sensitiveness, without ulterior bad effects. (Formulæ 28 and 42.)

When anæsthesia is due to bulbar lesions we can only guard the patient from the risk of "swallowing-pneumonia" by the use of the stomach feeding-tube. The same precautions may be required in marked cases of diphtheritic neuritis, but this affection generally disappears under the same treatment as that required for the paralysis of the palate (p. 426).

* F. Semon, *Brit. Med. Journ.*, 1895, i., Jan. 5.

REFERENCE

- F. E. Hopkins, "Neuroses of the Pharynx," *Trans. Amer. Laryngol. Assoc.*, 1904; and *Laryngoscope*, xiv., 1904, No. 7, p. 506.

Fig. 1.—Soft fibroma projecting from the ventricle of Morgagni ; so-called prolapse of the ventricle. (See p. 477.)

Fig. 2.—Laryngeal erysipelas. (See p. 407.)

Fig. 3.—Gummatous infiltration of the left vocal cord, of which the mobility is slightly impaired. (See p. 642.)

Fig. 4.—Syphilis of the larynx. Hypertrophic infiltration of the epiglottis ; swelling of the ary-epiglottic folds ; injection and impaired abduction of the vocal cords, from perichondritis of the crico-arytenoid articulation. (See p. 643.)

Fig. 5.—Early tuberculosis. Note the anæmic epiglottis, with two small nodular eminences on the left side ; the paresis of tension in the right cord ; and the limited area of redness of the left cord. (See p. 592.)

Fig. 6.—Tuberculosis in an elderly man. The case was for some time mistaken for malignant disease, but the commencing ulceration of the cord is indicative of tubercle. (See p. 593.)

Fig. 7.—Carcinoma of the larynx. The left side remains immobile during phonation. (See p. 484.)

Figs. 1, 2, 3, 4, 5, and 7 are from Grinnell's "Atlas and Abstract of the Diseases of the Larynx."

PLATE XIII.

of the larynx upwards or downwards. It is very different when there is any obstruction to the air-way (*see* Stenosis, p. 536). During vocalization the larynx remains stationary, but in the emission of higher notes it is felt to be raised. Advantage is taken of this in laryngoscopic examination, when the patient, by saying *E*, brings the whole larynx nearer to the examining mirror. But the greatest excursions of the larynx will be felt to take place during swallowing, and it will be realized that anything firmly attached to the larynx or trachea will be seen to move with the act of deglutition.

Passing the finger downwards on the thyroid cartilage, an interval is felt between its lower margin and the cricoid cartilage, filled by the crico-thyroid membrane. A small but important lymph-gland lies immediately in front of this membrane.

The front of the cricoid ring is an important surgical landmark. In a child of 3 months it is on a level with the lower border of the 4th cervical vertebra; at the age of 6 years it is as low as the 5th cervical vertebra; and at puberty it has descended to the 6th vertebra, the one with the "carotid" tubercle, and is at the same level as the omo-hyoid muscle.

Below the cricoid cartilage the larynx is connected with the trachea by the crico-tracheal membrane. About seven or eight rings of the trachea are present in its neck portion (Figs. 282 and 283, p. 723). In the lower portion of its cervical course the trachea lies at some distance, about $1\frac{1}{2}$ inches, from the surface, and as it passes behind the manubrium sterni it is on a level with the disc between the 2nd and 3rd dorsal vertebræ (Fig. 265, p. 705).

The isthmus of the thyroid gland crosses the trachea at the 2nd, 3rd, and 4th rings (Fig. 282, p. 723). It can seldom be palpated in health. The lateral lobes of the gland ascend on each side and partially cover the two lateral plates of the thyroid cartilage. Occasionally a third lobe, known as the pyramidal lobe, extends upwards in front of the trachea and cricoid cartilage, being suspended from the hyoid bone by the suspensory ligament of the thyroid gland.

The rima glottidis corresponds to the centre of the middle of the anterior margin of the thyroid cartilage. It measures about 1 inch from before backwards, and $\frac{1}{3}$ inch at its widest, though this may increase to $\frac{1}{2}$ inch. In females, and in males before puberty, the glottic space measures 8-9 lines antero-posteriorly.

The mucous membrane varies in different parts of the larynx, both in structure and in thickness. Acinous glands are numerous where the mucosa is thickest, i.e. in the ventricles of Morgagni, the ventricular bands, and on the pharyngeal surface of the larynx.

Over the vocal cords the mucous membrane is very thin and closely adherent, and glands are very scanty. Stratified, pavement epithelium is found (1) on the true vocal cords, (2) the pharyngeal surface of the larynx, (3) the posterior surface of the epiglottis, and (4) over part of the ary-epiglottic folds. Ciliated epithelium clothes the rest of the larynx.

The actions of the intrinsic muscles of the larynx are described on p. 500, and the innervation is considered on p. 501.

CHAPTER XXXIV

INJURIES, FRACTURES, AND DISLOCATIONS. CONGENITAL AFFECTIONS

INJURIES AND FRACTURES

Etiology.—Three or four cases are on record in which the hyoid bone has been fractured by muscular action, but direct violence is the usual cause of fractures of the laryngeal cartilages. They are not of common occurrence, and this is probably due to the elasticity of the cartilages, and the mobility of the larynx as a whole.

Injuries and fractures are more common in adult life, but doubtless only because in infancy and old age there is less exposure to accident. They are more frequent in men than in women.

Direct violence, or direct compression (garrotting), may produce fracture, but concussion is not sufficient unless applied directly while, at the moment, either the vertebral column or the front of the neck is a fixed point. One or other of these conditions occurs in street accidents, kicks from horses, acrobatic performances, or when a cyclist is flung forwards against the handle-bar. Fracture of the larynx is rare in hanging, as the cord slips upwards and only breaks off the great cornua of the hyoid.

Mechanism and pathological anatomy.—The thyroid cartilage is generally the one affected; the cricoid gives way more rarely. The thyroid may fracture on account of its anterior angle being enlarged or compressed—the latter is the more common event, as blows are generally delivered obliquely. The fracture may be central, vertical, or irregular, or only involve the cornua. The external perichondrium may rupture, and the mucous membrane be torn, or only detached.

If the cricoid breaks only in one place, it is generally behind; if in several places, the fractures are scattered. The hyoid bone may give way in the body or the cornua.* Healing occurs by fibrous union in the fractured cartilage. Portions of cartilage may be exfoliated. In some cases, whether of accidental or of suicidal origin, there may be accompanying lesions of the hyoid bone, trachea, jaw, clavicle, or neck.

* H. J. Davis, *Proc. Roy. Soc. Med.*, iii., Feb., 1910, p. 77.

The causes of death may be sudden cardiac inhibition, obstructive asphyxia, spasm, shock, emphysema of the mediastinum, broncho-pneumonia, and septicæmia. Even in cases which recover the patient may be left with stenosis, requiring treatment or the permanent use of a tracheotomy tube. It is possible, however, that statistics drawn from recorded cases may give an exaggerated idea of the gravity of the accident, as in other instances the fracture may pass unrecognized during the lifetime of the patient. Evidence of old fractures of the hyoid bone or the laryngeal cartilages has been found in 9 out of 100 bodies examined in the dissecting-room.*

Treatment.—The chief danger lies in the interference with respiration. If this is met by an early performance of tracheotomy, there is no reason why a much larger proportion of cases should not recover. Some writers recommend a tracheotomy in all cases. It should certainly be done if there is any trace of subcutaneous emphysema, and the onset of dyspnœa should not be awaited before resorting to it. A fatal attack of suffocation may occur suddenly, so that no patient should be left beyond the reach of prompt assistance.

Intubation has been recommended as suitable in these cases; but when the cartilages are much crushed it would be safer to lay open the larynx by laryngo-fissure (p. 732), after a preliminary tracheotomy, and endeavour to replace the fragments in position before inserting an intubation tube, to act as an internal splint.

Injectations of morphia, the application of ice to the neck, and scarifications of the vestibule of the larynx may be called for.

HABITUAL DISLOCATIONS OF LARYNGEAL ARTICULATIONS

(a) DISLOCATION OF THE CRICO-THYROID ARTICULATION

The rare condition has been described in which the inferior cornu of the thyroid cartilage is displaced forwards from the articular facet on the cricoid. This luxation occurs on deep inspiration or on gaping, especially when in a constrained position. It is generally unilateral, and may occur repeatedly for days together, or only at intervals of many weeks. When it takes place there is local pain and a slight swelling, with some feeling of anxiety. The swelling disappears at once, and the displacement is reduced by slight pressure with the finger or even by making a swallowing movement. Hence no medical treatment is necessary, as the patient is always able to reduce the dislocation himself. This luxation is attributed to contraction of the muscles attached to the thyroid

* Arbuthnot Lane, *Path. Soc. Trans.*, xxvi., 1885, pp. 52-55.

has been compared to stammering (John Thomson, McBride, Ashby, Stamm, Herzfeld).

2. Inco-ordination of the respiratory movements, possibly due to some developmental backwardness of the cortical structures which control them, resulting secondarily, by aspiration, in an exaggeration of the normal infantile type of larynx (John Thomson and Logan Turner).

3. Muscular spasm (Variot, Löri, Goodhart).

4. Reflex irritation from adenoids (Eustace Smith).

5. Paralysis of the abductor muscles, i.e. the crico-arytenoidei postici (Robertson).

6. Compression from hypertrophied thymus gland (Avellis).

7. Congenital malformation of the vestibule of the larynx (Variot [his later view], Bruder, Sutherland and Lack, Cautley).

All but the last of these are only of historical interest since the introduction of Killian's direct laryngoscopy.

Adenoids are absent in most of the cases, and the presence of these growths can hardly be looked on as an essential causative factor.

Symptoms.—The stridor, which is the most characteristic feature of the affection, is usually noticed at or soon after birth. It has been reported as occurring as late as the third week of life, but in such cases a slight amount of difficulty in breathing was probably overlooked earlier. It is, as a rule, only on account of the stridor that advice is sought, and in a large number of cases the patients appear to be in good health, and many seem to suffer no inconvenience from the stridor.

The character of the sound varies. It has been described as similar to grunting, the purring of a cat, sobbing, hiccough, or the croaking of a frog. It has been compared to the clucking noises made by a hen or chickens, and is often stated by mothers to be like croup. "Inspiration begins with a croaking noise and ends in a high-pitched note; expiration is accompanied by a short croak when the stridor is loud, but at other times it is noiseless" (John Thomson). Inspiratory stridor is always much louder than expiratory. The degree of stridor diminishes in proportion to the regularity and shallowness of the breathing. In most cases there are periods of complete intermission. When the child is asleep, being nursed, or with the head low, the stridor tends to diminish. On the contrary, whenever the child is awakened or taken into a cold atmosphere, or when he is hurried or stimulated, it tends to increase. Hence it becomes more marked when the child is awakened, is taken out of doors, when placed in a cold bath, when coughing or crying, and when frightened, or fed too quickly.

Kelly * have demonstrated that the larynx, as seen clinically, is of an exaggerated infantile type. The epiglottis is very long and tapering, and its lateral margins are rolled backwards so as to meet, and thus form a complete cylinder above. The greatly reduced entrance to the larynx is bounded by the ary-epiglottic folds, which are too closely opposed to admit any but the slightest amount of air. The croaking noise is caused by the free and unsupported part of the posterior laryngeal wall and neighbouring loose tissue on the summits of the arytenoids, which is sucked forwards and inwards during inspiration.

Post-mortem examinations by Lees,† McIlraith,‡ Cautley,§ Variot,|| Henry Ashby,¶ Koplik,** and others, have corroborated these observations. It remains to be settled whether the narrowing of the laryngeal orifice is primary or secondary.

Rocaz states that with the disappearance of the bruit the epiglottis is gradually unrolled.†† Sutherland and Lack acknowledge that as the child grows the stridor disappears, but the malformation remains. They explain this by the fact that the parts forming the upper portion of the larynx become less yielding. It has been objected that the condition described by Sutherland and Lack is nothing more than the normal infantile type of larynx, but Lack asserts that he has frequently examined the larynx in children and has never observed the malformation described except in association with this affection.

Progress.—As already mentioned, this peculiar stridor tends to disappear during the second year. It may have increased for some weeks or months after its first appearance, and then it tends to diminish gradually. After the end of the second year, it is occasionally elicited, in a slight degree, when there is any demand for a hurried or deep inspiration.

Diagnosis.—This affection must be diagnosed from laryngismus stridulus, ordinary laryngitis, true croup (laryngeal diphtheria), and growths in the larynx—the most usual in infants being papillomata. Direct inspection of the interior of the larynx, when available, is the promptest method of settling the diagnosis (p. 44). Assistance can be obtained from bearing in mind that congenital laryngeal stridor commences early, and is not sudden and acute

* *Brit. Med. Journ.*, Sept. 26, 1908, p. 895.

† *Trans. Path. Soc., London*, xxxiv., 1883, p. 19.

‡ *Med. Press*, May 2, 1900, p. 447.

§ *Reports of the Society for the Study of Diseases in Children, London* vi., p. 231.

|| *Journ. de Clin. et de Thérap. Infantile*, 1898.

¶ *Brit. Med. Journ.*, Nov. 24, 1906, p. 1488.

** *Arch. of Pediatrics*, Dec., 1905.

†† *Revue Mensuelle des Maladies de l'Enfance*, xx., Fév., 1902, No. 2.

CHAPTER XXXV

LARYNGITIS

ACUTE LARYNGITIS

Synonyms.—*Acute inflammation of the larynx ; cynanche laryngea ; angina laryngea ; acute catarrh of the larynx.*

Definition.—An acute catarrhal inflammation of the mucous membrane of the larynx, characterized by hoarseness or aphonia, and occasionally by cough. When uncomplicated it is without danger to life, and subsides spontaneously in three to ten days.

Etiology.—Among the causes of this affection are those already enumerated as generally productive of catarrh (p. 91). The disease is more frequently met with in the months of winter and spring ; men suffer from it oftener than women ; and in the young the condition is so important, and presents so many special features, that it will be considered separately (p. 445).

Exciting causes.—Excessive and, more particularly, improper use of the voice will often induce an attack of acute laryngitis, and it may follow on the vomiting and retching of an alcoholic debauch, or an attack of sea-sickness, or passionate attacks of crying or sobbing.

Among traumatic causes are the passage of foreign bodies into the larynx, the clumsy introduction of instruments, the accidental irritation produced by powders or paints intended only for the pharynx, and bungling attempts to introduce the stomach-pump.

Acute laryngitis may occur in acute infectious fevers, such as influenza, measles, whooping-cough, smallpox, typhoid, and scarlet fever. I have seen it in an acute invasion of the larynx with tubercle. Acute laryngitis may be of septic origin, and is occasionally infectious. It may be directly excited by the irritant fumes of chlorine, bromine, iodine, and ammonia, or of sulphuric, nitric, or other fuming acids.

Pathology.—At first there is hyperæmia, with dryness from arrest of the mucous secretion. As this stage abates there is an increased flow of mucus mixed with the cast-off leucocytes. It is doubtful if actual ulceration is ever found as a result of a simple catarrhal process. The defects which are sometimes visible on the vocal cords are probably more apparent than real, and at most are only abrasions of the epithelial surface. The affection may be limited more particularly to one part of the larynx, receiving accordingly the name of epiglottiditis, arytenoiditis, or chorditis.

Symptoms.—Acute inflammation may primarily attack the larynx, whence it spreads downwards to the trachea and bronchi,

are congested, and may be so swollen as to conceal the vocal cords more or less completely. The inflammation may spread to the subjacent crico-arytenoid muscles, so that the cords fail to approximate completely on phonation, and aphonia is then more marked (Plate XIII., Fig. 4). In other cases complete approximation is interfered with by the swelling of the lax mucosa lying over the interarytenoid region. Hæmorrhage occasionally takes place in the submucous tissue, and blood, generally in small streaks only, may escape from the surface. This rare variety is called hæmorrhagic laryngitis.

The free muco-purulent secretion of the later stage is more apparent, as it comes from the trachea and wells over the interarytenoid region to pass into the œsophagus.

The epiglottis, particularly the upper portion, is not always involved. The inflammation is never limited to one side, and is generally symmetrical on both sides. It will, in most cases, be found extending to the nose, pharynx, and trachea.

As recovery takes place the cords become grey, and then resume their normal tint and form. Some paresis of the internal tensors may remain for a time, particularly in cases due to influenza, or where the voice is not sufficiently rested.

Diagnosis.—The comparatively sudden onset, the associated catarrhal conditions, the absence of any laryngeal growth, and the bilateral and uniform distribution of the inflammation will obviate any mistake in the diagnosis. Any decided elevation of temperature would be opposed to a diagnosis of simple acute laryngitis. The probability of a foreign body having entered the larynx should never be overlooked, and in cases which do not soon yield to treatment the diagnosis should be reviewed in regard to tubercle.

Prognosis.—Acute laryngitis is free from danger when it is a primary affection. Recovery takes place in three to eight days, or else the condition passes into a chronic affection. As a complication in infectious fevers or systemic conditions, and when occurring in the aged or broken down, it is of graver importance. Caution is required in giving an opinion as to what voice a patient with laryngitis can produce. At the beginning of an attack the singing voice may be much hoarser than appearances would warrant. Towards its conclusion baritones and contraltos appear to be able to sing sooner than tenors or sopranos.

Treatment.—This should be (a) local, (b) general, and (c) preventive. Voice-rest is more important, and should be as complete as possible. Recovery will be more prompt if general rest is enjoined, and the patient kept warm in bed, in a freely ventilated room, and treated as directed for catarrhal fever (p. 87).

In the early stages there should be no attempt at direct medica-

stenosis, the œdema may be reduced by sucking ice and the application of ice-bags or cold-water coils to the neck. A laryngeal spray of 2 per cent. cocaine and 1-2,000 adrenalin can be used every hour. Hypodermic injections of pilocarpin (gr. $\frac{1}{8}$) have given good results. The œdema produced by iodide of potassium will disappear more quickly if bicarbonate of soda is freely given; in many cases its occurrence may be prevented by combining some tincture of nux vomica with each dose of iodide. If the œdema is more threatening, it should be reduced by freely scarifying the infiltrated tissues, previously cocainized, under the guidance of the laryngeal mirror. If the stenosis is very acute or the symptoms are threatening, tracheotomy should be performed. In all cases the necessity for this operation may declare itself quite suddenly. The treatment of the primary septic form has been considered elsewhere (p. 410).

The œdema met with in the larynx in cases of angio-neurotic œdema (Quincke's disease) is described at p. 690.

MEMBRANOUS LARYNGITIS, NON-DIPHTHERITIC

Synonym.—*Fibrinous laryngitis*.

Definition.—An inflammation of the mucous membrane of the larynx, accompanied by the formation of a membrane, and not caused by the Klebs-Löffler bacillus. It may be due to various other micro-organisms. It may be acute or subacute.

Etiology.—Except when of diphtheritic origin, a false membrane is rarely met with in the larynx. It may be caused by the application of strong caustics, traumatism, or the inhalation of boiling steam or irritating vapours. It may be of septic origin, and due to various staphylococci and streptococci, or the *Bacillus pyocyaneus*.* The membrane is similar to that met with in diphtheria, but is much less frequently found in the pharynx or nose.

Symptoms.—The chief symptoms are discomfort, hoarseness, and croupy cough. Dyspnœa may appear early in acute cases, but is seldom complained of when the membrane forms slowly. General symptoms will depend on the causative factor, but are seldom so marked as in diphtheria. In some cases the patient may continue to go about his work throughout the attack.

Examination will show the presence of a greyish-white or dirty-grey membrane. It will be found to be closely adherent to the mucous surface.

Diagnosis.—This form of membranous laryngitis is distinguished from diphtheritic laryngitis by remembering that the latter, in

* J. W. Bond, *Proc. Laryngol. Soc., London*, iv., June, 1897, p. 103.

traced between laryngeal affections and the sexual system.* Some drugs, such as arsenic, and particularly iodide of potassium, will produce laryngeal catarrh, and in sensitive subjects the inhalation of certain odours even is sufficient.†

Chronic laryngitis is nearly always present as a secondary phenomenon in association with laryngeal tuberculosis, lupus, syphilis, leprosy, paralysis, and neoplasms.

Other causes are mentioned under Acute Laryngitis (p. 442). The most common enemies of the larynx are dust, alcohol, and tobacco.

Pathology.—There is permanent hyperæmia of the blood-vessels from long-standing irritation. The epithelium may be abraded in parts. There is small-celled infiltration of the submucous tissues. In many cases there is a certain amount of myositis owing to the proximity of the intrinsic muscles of the larynx. The mucous glands are stimulated into increased secretion of a thick, tenacious mucus. The older authors described, under the title of "glandular laryngitis," a separate variety due to the special affection of the racemose glands. There appears to be no justification for this.

Symptoms.—The constant, and sometimes the only, symptom complained of is the alteration of the voice. This is at first intermittently husky, but in well-established cases the hoarseness becomes persistent. It is more marked after a rest, or on rising in the morning, and tends to disappear after a little use. The tone of the voice is lowered. Aphonia is seldom complete, except after prolonged or extreme forcing of the damaged organ. A sense of fatigue and soreness in the throat is complained of. Cough is not usual, though it may be started by efforts at talking. There is frequent hemming and hawking.

Abundant expectoration generally indicates that the trachea and bronchi are affected with the same catarrhal process. The alterations in voice are more noticeable in women and in tenor voices.

In a considerable number of cases the patient will also present symptoms of concomitant nasal or pharyngeal catarrh.

Examination.—The appearances in the larynx vary according to the severity, duration, and extent of the disease; but in all cases it should be noted that there is absence of acute inflammation, and that the changes are bilateral, and generally more or less symmetrical. The mucous membrane is congested, redder in females and in tenors, and darker and more purplish in basses and the more chronic cases. Pellets of thick mucus may be seen hanging about the posterior section of the larynx. The cords themselves in many cases are only slightly affected, having lost their clear, mother-of-pearl look, and appearing dull and dirty-grey. At other times arborescent vessels are seen ramifying on them. (In

* F. Semon, *Brit. Med. Journ.*, Jan. 5, 1895

J. N. Mackenzie, *Journ. of Laryngol.*, March, 1898.

† Joal, *Rev. Hebd. de Laryngol.*, 1894.

of the etiological factors, and these will generally be found outside the larynx. In a large number of cases—the majority, according to Bosworth*—treatment will have to be directed to the nose or naso-pharynx. Examination of the digestive, renal, or uterine functions, or the detection of gout or rheumatism, may in some cases afford the chief indications for treatment. The habits of the patient may require attention as regards food, drink, clothing, sleep, exercise, tobacco, fresh air, and ventilation. When originating primarily in the larynx, it will generally be discovered that the laryngitis is attributable to faulty use of the voice.

In all cases the treatment should begin by resting the voice. Strict silence is desirable, and if this is impossible, then shouting, speaking in the open air, lecturing in close, crowded, dusty or stuffy rooms should certainly be avoided, and whispering should suffice and be limited to the barest necessities of life.

When there is much secretion, treatment may be commenced by a cleansing alkaline spray (Formulæ 8 to 11). Antipyrin (gr. v to ʒi), menthol (gr. ii to ʒi), or carbolic acid (gr. ii to ʒi) may be added for their sedative action. Oily sprays, medicated with such stimulating oils as menthol, eucalyptus, oil of wintergreen, oil of cassia, or pine oil, have to a large extent superseded the steam inhalations which were formerly employed for carrying the essential oils into the air-passages.

In inveterate cases, astringents may be used, in the form of watery sprays, to which are added one or other of the following, namely, nitrate of silver (gr. ii–v), sulphate of zinc (gr. v–x), chloride of zinc (gr. ii–vi), perchloride of iron (gr. iii–viii), sulphate of copper (gr. iii–x), to the ounce.

Massei recommends a 2 per cent. spray of lactic acid.

The laryngeal brush is seldom resorted to. It might be required in some inveterate cases, when we generally employ nitrate of silver solution, beginning with a strength of 5 gr. to the ounce, increasing gradually, according to the amount of reaction produced, up to 50 or 100 gr. to the ounce. The frequency must be proportionate to the local condition and to the reaction produced. There are few cases in which an application once a week is not sufficient. In chronic but less inveterate cases, chloride of zinc in the strength of 20–30 gr. to the ounce may be used. The application of fused nitrate of silver or chromic acid, incisions into the cords, and the intralaryngeal use of the galvano-cautery, are dangerous proceedings which are seldom called for.

Any remaining paresis of the cords may be met by the

* "Diseases of the Nose and Throat," 3rd ed., p. 625. 1897.

in the trachea. When removed, the surface underneath them may be abraded. The tension of the cords is generally impaired. In the majority of cases the purulent discharge can be traced up to the postnasal space and the nose.

Pathology.—The process begins from the mucous surface, which is first infected and then abraded. Many of the mucous glands are destroyed. The underlying tissue is replaced by connective tissue. There is anæmia from the constant presence of septic material, and atrophy from want of use of the muscles.

Prognosis.—The prospect of cure chiefly depends on the possibility of detecting and removing the infecting focus of supuration.

Treatment.—Search must first be made for the etiological factor, and treatment directed accordingly. The possibility of a syphilitic diathesis, acquired or congenital, should not be lost sight of. Even if nothing points to specific disease, relief is frequently obtained from gently stimulating the atrophied laryngeal glands by administering small doses of iodide of potassium. The larynx should be sprayed or syringed out frequently with an alkaline solution (Formulæ 8 and 9), and when cleared of crusts it may be lubricated with a spray of parolein containing menthol or other antiseptics. A healthier condition of the mucosa may be promoted by painting with some form of Mandl's solution (Formula 71). Lozenges, such as chloride of ammonium, tend to detach the secretion, and the trochisci acidi carbolici (Formula 43) are cleansing and comforting. If the mucous surface is abraded it may be occasionally painted with weak nitrate of silver. Dust, alcohol, and tobacco should particularly be avoided. A visit to the alkaline or sulphur spas of Ems, Mont Dore, Aachen, or Harrogate will generally be found beneficial.

SUBMUCOUS HÆMORRHAGE

Definition.—An extravasation of blood below the mucous membrane, due to sudden strain. It must be distinguished from the inflammatory oozing of blood called "hæmorrhagic laryngitis" (p. 444).

Etiology.—A submucous hæmorrhage is nearly always the consequence of some sudden vocal exertion, as in talking, singing, screaming, or even sneezing, but it may also result from the laryngeal strain involved in closing the glottis in order to lift a heavy weight.* These hæmorrhages may occur with trained singers, and in women are more apt to occur at the menstrual period.† The affection is rare.

* Georges Gellé, *Arch. Internat. de Laryngol.*, 1899, No. 3.

† J. Garel, *Ann. des Mal. de l'Oreille*, xxiv., ii., 1898, No. 10, p. 281.

in young female teachers it would seem that such predisposing factors as anæmia and irregularities of digestion, or menstruation, play an important part. Any vocal strain, as in talking to the deaf, shouting in a noisy room or vehicle, or yelling in the open air, will bring on the condition. Nodules in singers are caused by a faulty method of voice production, particularly by attempting to sing in a register beyond the patient's powers, and by "squeezing" the voice. Hence they are met with more commonly in tenor and soprano voices, and are rarely if ever encountered in basses and contraltos. The method called the "coup de glotte" has been particularly blamed as a cause. Moure states that the condition is met with in children who join in part-singing and are forced to take a register beyond their natural compass.*

Pathology.—The hypertrophy is generally bilateral, although



Fig. 208.—Singer's nodules.

Larynx in quiet respiration. Shows the nodules in the usual situation on both cords.

Fig. 209.—Singer's nodules.

The same larynx as shown in Fig. 208, during quiet and unforced singing. The voice was husky, diplophonic, and inclined to crack.

it may be more marked on one side than on the other (Figs. 208-211). It may affect the upper or the inner surface of the cord. It consists of normal stratified epithelium in the simple cases, in some instances with a small-celled infiltration of the sub-mucous layer; while many distinct "nodules" are found under the microscope to be oedematous fibromata.† In certain cases the inflammatory process is not limited to the mucous surface but entails a certain amount of myositis.‡

Examination.—There is more or less general laryngeal catarrh. In some cases the hypertrophy takes the form of a rounded eminence in the centre of the upper surface of the cord, as if a split hemp-

* *Rev. Hebd. de Laryngol.*, xvii., 1896, No. 6, p. 146.

† J. W. Bond and Sinclair Thomson. *Proc. Laryngol. Soc.*, London, III., March 11, 1896, pp. 66-67, 81-82.

‡ Kanthack, *ibid.*, IV., 1897.

anæmia, is treated on general principles. The most important measure is rest for the voice. Strict silence should, if possible, be insisted on, and it may require months of absolute dumbness in some cases before the nodules will completely disappear. Sometimes improvement is quicker if the "humming" exercises recommended by Holbrook Curtis are carried out.*

Before resuming professional use of the voice, any faulty methods of production should be corrected. When this has been neglected, I have known of singer's nodules recurring a second and even a third time after removal. If the circumstances of the patient make prolonged treatment impossible, or if the nodules are well marked, they can be removed with intralaryngeal forceps. If they are small and sessile, and if the practitioner possesses the necessary dexterity, the thickening may be touched with a fine galvano-cautery point.†

HYPERTROPHIC LARYNGITIS

Definition.—A form of chronic laryngitis in which there is thickening of the mucous membrane, more or less generalized.

Etiology.—This embraces all the causes already mentioned for chronic laryngitis (p. 451). The hypertrophic form is more apt to be met with when the chronic condition has been neglected for some time, and the use of the voice insisted on, or the external conditions have not been removed. Hence it is very frequent in street-hawkers, salesmen, or those exposed to dusty occupations. It is not uncommonly due to prolonged irritation from nasal suppuration (p. 233). Chronic alcoholism is a potent factor in many cases. It is frequently met with in syphilitic subjects ‡ (p. 642).

Symptoms.—The symptoms are those of chronic laryngitis (p. 451), but the change of voice is more marked; there is less tendency to cough; and, although the condition is subject to acute or subacute exacerbations, the patient suffers less in using his chronically husky and toneless voice.

Examination.—The laryngoscope reveals the conditions present in chronic laryngitis, and, in addition, the thickening which has occurred in the mucous and submucous lining of the larynx. This may be more or less uniformly distributed, but it is found most commonly in the interarytenoid space. Here it may stretch in

* "Voice-Building and Tone-Placing." New York, 1898.

† A. Wylie, *Lancet*, Nov. 23, 1907.

E. A. Peters, *Proc. Royal Soc. Med.*, Laryngol. Section, Dec., 1910.

C. J. Koenig, *Arch. Internat. de Laryngol.*, 1910.

‡ Massei, *Ann. des Mal. de l'Oreille*, xxv., i., 1899, No. 2, p. 113.

(c) *Tubercular infiltration* of the larynx without superficial ulceration may take place centrally in the interarytenoid space, or be so uniformly distributed over both arytenoid regions that its appearance may resemble that under consideration (Plate XVII., Fig. 2). Of course, any break of surface of the deposit, or any one-sidedness in its distribution, would assist the diagnosis; discomfort in the larynx, or marked pallor of the mucous membrane, would also suggest tuberculosis and would direct attention to a careful investigation of the chest, sputum, temperature, weight, and family history. The difficulty is increased when we remember that pulmonary tuberculosis and simple or syphilitic hypertrophic laryngitis may co-exist; but treatment of the lung claims first attention in any case, and will generally improve the condition of the larynx and so help to clear up the diagnosis.

Prognosis.—Recovery will depend on the possibility of detecting and removing the cause. Considerable improvement can be secured when the condition is due to other causes than syphilis. Treatment may entail prolonged rest to the voice, and a recrudescence can only be avoided by shunning any external irritating conditions. In many cases some permanent impairment of voice is inevitable.

Treatment.—This is similar to that recommended for chronic laryngitis (p. 451). The treatment of the hypertrophic form has to be more persevering and more thorough. It is in this variety that the application of caustics, either fused on probes or on the laryngeal brush, finds its principal use, particularly when the chief site of the disease is the interarytenoid region. It is sometimes necessary to remove portions of the hypertrophic tissue. For patients who can afford it, the method of treatment carried out at Ems, Mont Dore, Cauterets, Harrogate, and similar health resorts is particularly useful.

PACHYDERMIA LARYNGIS

Definition.—A form of hypertrophic laryngitis characterized by more or less symmetrical thickenings over the posterior ends of the vocal cords.

Pathology.—Considerable attention has been given to this affection since its pathology was first fully described by no less an authority than Virchow, under the title of "*pachydermia verrucosa laryngis*."* Possibly this has secured more interest for the condition than its importance warrants, for it is but one clinical form of the hypertrophic variety of laryngitis. The hypertrophied mass is formed of white or greyish-white thickenings which can be stripped off in layers, and is found to consist of epithelium thickened and undergoing epidermoidal changes. The subepithelial connective tissue is also thickened, and

* *Berl. klin. Woch.*, 1887, No 32.

Fig. 1.—Submucous hæmorrhage of the vocal cords. This occurred suddenly in a school teacher. (See p. 456.)

Fig. 2.—Pachydermia laryngis. (See p. 462.)

Fig. 3.—Tertiary syphilis of the larynx. The epiglottis had been partially destroyed in previous attacks. There is infiltration of all the tissues on the left side of the larynx. (See p. 642.)

Fig. 4.—Scleroma in the subglottic area. (See p. 665.)

Fig. 5.—Angioma (telangiectasis) of the larynx. (See p. 476.)

Fig. 6.—Webbing of the vocal cord in the anterior commissure, from syphilis, in a woman aged 71. (See p. 642.)

PLATE XIV.

of the mucous membrane at that point to the subjacent cartilage. The hypertrophies are uniform in shape, free from inflammation or ulceration, and are generally bathed in sticky mucus, which may stretch across in threads from one side to the other after the hypertrophic masses are pressed together on phonation, and then gape apart in inspiration (cf. Plate XIV., Fig. 2). Sometimes they are so large as to appear almost pendulous. Occasionally the pachydermia is limited to one side, and then it generally produces an indentation on the opposite processus vocalis. In some cases there is accompanying hypertrophy of the neighbouring interarytenoid region. The movements of the cords may be somewhat impaired in abduction. In some cases the usual symptoms of chronic laryngitis will be present.

Diagnosis.—This is based on the bilateral character and appearances of the thickenings; the history, the slow growth, and the crateriform depression. When the rarer condition occurs of one side only being affected, the suspicion of malignant disease may be aroused, though, if strictly limited to the area of the vocal process, the condition is more likely to be one of pachydermia than of epithelioma. A certain amount of impairment of the movement of the cord may also occur with simple hyperplasia. In doubtful cases it is wiser to reserve an opinion until the condition has been observed for some time, before removing a portion of the growth for microscopic examination. The diagnosis has in some instances to be made between simple pachydermia and that due to syphilis or to tubercle.

Prognosis is favourable as regards life, and continued, if impaired, use of the voice can generally be promised. The affection is very chronic, and not very amenable to treatment. In some cases improvement in the voice takes place owing to more complete invagination of one thickening into the other. There is no evidence that the disease is apt to assume a malignant character.

Treatment is not very satisfactory. The reader is referred to what has been said in the sections on chronic laryngitis, catarrhal and hypertrophic. The internal administration of iodide of potassium is generally recommended. Sprays or laryngeal washes of salt and water are sometimes helpful. Painting with nitrate of silver in increasing strengths here finds a suitable indication. Iodine has failed in the hands of Stoerk and Gottstein. Painting with lactic acid or salicylic acid in alcohol has been recommended. The very tough pachydermic tissue may be removed by caustics, the galvano-cautery, or cutting instruments. Electrolysis has been advised by Chiari.* In case of pain, loss of voice,

* *Arch. f. Laryngol.*, 1894, Bd. ii., Heft 1.

Syphilis, in the form of diffuse gummatous infiltration, is apt to occur on the inner surface of the alæ of the thyroid cartilage, producing a round swelling of the ventricular band or the subglottic region, pushing the vocal cord inwards, limiting its movement, and reducing the size of the glottis. It may remain more or less stationary, or induce fibroid induration, or break down (Plate XIII., Fig. 4, and Plate XIV., Fig. 3). (*See Syphilis*, p. 462.)

Symptoms.—If acute, perichondritis may be ushered in with malaise, rigor, and the feverish symptoms of the primary infection. The local symptoms will vary very much according to the situation, severity, and extent of the perichondritis. The most characteristic are pain and tenderness; but there may be alteration in voice, cough, slight and slowly increasing dyspnœa, or dysphagia. A chronic abscess is revealed by the pus which may be seen recurring in the larynx. Bone and necrosed cartilage can occasionally be felt with the probe; crepitus is seldom discoverable. One or both vocal cords may be fixed, and a red, rounded, inflamed swelling will appear over the area of cartilage affected (Plate XIII., Fig. 4, and Plate XIV., Fig. 3). The stenosis caused by a perichondritis may be due to several conditions, such as œdema, abscess, fixation of cord, impaction of necrosed cartilage, collapse of the laryngeal wall following exfoliation, or the subsequent retraction of scar tissue.

If the necrosed sequestrum is not exfoliated, purulent fistulæ, outside or inside the larynx, may continue for years, especially in syphilitic cases, causing pain, dysphagia, fetor, and cachexia.

Prognosis will depend on the cause. The affection is always of serious import. In malignant disease and tuberculosis it is very grave. In syphilis the outlook is more hopeful, as it also is in trauma, if the foreign body can readily be removed. But if the sequestrum, in either case, is extensive the patient may succumb to chronic suppuration, exhaustion, or septic pneumonia. Death may also occur from the sudden bursting of an abscess. In all cases there is the prospect of the patient being left with an impaired voice and the dyspnœa of chronic stenosis.

Diagnosis is difficult in most cases, for a case must be far advanced before bare cartilage can be felt with a laryngeal probe. In tuberculosis there are, as a rule, other indications of the disease; but between syphilis and malignant disease the differentiation will require full consideration of the history, the effects of antisyphilitic treatment, the microscopical appearances, and the progress of the case. It is still more difficult if both diseases are present together in the larynx. As the laryngeal appearances resemble those of œdema (p. 446), this latter affection should

CHAPTER XXXVI

LARYNGISMUS STRIDULUS

Synonyms.—*Adductor spasm; spasmodic croup; false croup; cerebral croup; asthma of Kopff; thymic asthma; child-crowing; spasm of the glottis; direct spasm of the glottis* (Goodhart and Still); *respiratory glottic spasm; spasm of the larynx in infants.*

Definition.—A form of laryngeal stridor in children, of sudden onset and without fever. It may be met with in the first month of life (Eustace Smith), and up to the eighth or ninth year, but usually appears between the fourth month and the end of the second year. It is more common in boys than in girls (Luc).

Etiology.—The affection is usually met with in congenitally feeble children, or in those who are the victims of improper diet or defective hygiene. Hence it is most commonly found in cases of rickets, and in those who are microcephalic or hydrocephalic. The exciting causes are traceable to some disorder of the upper air-passages or digestive tract. Among these the most frequent is naso-pharyngeal adenoids, but it may be some chronic nasal trouble, enlarged pharyngeal tonsils, bronchial glands, or teething.* The irritant is frequently claimed to be intestinal worms. It may occur, particularly in the feeble, in the course of measles or whooping-cough.

Symptoms.—An attack of laryngismus most frequently occurs at night, and its onset is often comparatively sudden. The child may go to sleep as usual, and, with or without a little previous difficulty of breathing, he will suddenly waken struggling for breath. The breathing is of a metallic, croupy character, and the forced efforts at inspiration produce a crowing stridor. In the efforts to fill the lungs the patient sits up, tossing his hands about, holding to the nearest support or clutching his throat. All the accessory muscles of respiration are thrown into action; the mouth is open, the nostrils are dilated, the chest is heaving; but as all these efforts fail to fill the lungs, the diminished pressure causes retraction of

* Lubet Barbon, *Rev. des Mal. de l'Enfance*, 1891, No. 9, p. 499.
Huber, *Arch. f. Pediatrics*, xi., 1894, p. 38.
Coupard, *Jahr. f. Kinderheilk.*, xxviii., S. 247.

CHAPTER XXXVII

TUMOURS OF THE LARYNX

BENIGN TUMOURS

Definition.—These are innocent or homologous growths, of which the tissue and structure correspond to the tissue from which they originate, or to part of it. Innocent neoplasms are occasionally referred to as laryngeal “polypi,” more particularly in French and German literature.

Frequency.—These growths are comparatively rare. Mackenzie took eight years to collect his first hundred cases,* and individual experience is still more slowly accumulated nowadays. Papillomata and fibromata are most frequently met with. Lipoma, angioma, chondroma, adenoma, myxoma, lymphoma, and thyroid-gland tumours are very rare. Eighteen cases of amyloid tumours have been recorded.†

Varieties. **Papilloma.**—This is the most common of all benign growths in the larynx. It occurs earlier than any other, and nearly all cases of laryngeal growths met with in infancy and up to the age of 10 are of this character. It may even be congenital.

Situation.—Any part may be attacked, but the tumour chiefly occurs on the vocal cords, the ventricular bands, and the parts below the cords, rarely on the epiglottis, and hardly ever in the interarytenoid region.

Histology.—The structure is that of an ordinary papilloma.

Appearance.—The growth may be single or multiple. It may be broad-based, flat and firm, varying in size from a millet-seed to a walnut, but averaging the dimensions of a large split pea (Fig. 214). In other instances the growth may be more or less pedunculated and heaped up into soft, cauliflower-like masses. The colour is white, pinkish, or even bright-red. The surface is irregularly warty, or mammillated like a raspberry or cauliflower (Fig. 219, p. 484). It is not ulcerated, and does not invade the tissue from which it springs. (Plate xv., Fig. 5.)

* “Growths in the Larynx.” London, 1871.

† Saltykow and Johanni, *Ann. des Mal. de l’Oreille*, xxxii., 1904, No. 12, p. 657.

bands, the ary-epiglottic folds, and the external (œsophageal) surface of the larynx. They rarely occur on the vocal cords; and when a growth in this situation collapses, with escape of liquid when grasped or incised, it is generally a fibroma which has undergone œdematous degeneration.

In *appearance* they may be broad-based or pedunculated. The surface is smooth, globular, semi-translucent, and blood-vessels are frequently seen coursing over it. The colour is greyish, yellow, pink or red.

Simple incision is not generally effective. Part of the cyst-wall should be torn away with forceps, or a hole should be burnt into it with the galvano-cautery.

Lipoma.—This type of neoplasm is very rare, only ten cases being recorded up to 1896. Pathologically it has been attributed to fatty degeneration taking place in fibromata.

The *situations* where it has been found are the epiglottis, ary-epiglottic folds, the ventricles of Morgagni, and the posterior wall. It may also be attached in the sinus pyriformis, and hang down into the œsophagus.

In *appearance* it is generally large and solitary. It may have a broad base or be pedunculated, and is generally movable. It is smooth, lobulated, yellow, or pale-pink, and elastic to the probe.

The tumour can in most cases be brought into direct view with the tongue-depressor, and can then be removed with an ordinary or an electric snare. Lipomata show some tendency to recur.*

Angioma is also very rare.† It is generally single and sessile, very irregular, varying in size from a lentil-seed upwards. It is also met with as a diffuse telangiectasis.‡ It occurs on the vocal cords, ventricular bands, ary-epiglottic folds, or sinus pyriformis (Plate xiv., Fig. 5). The colour is bright or dark red, and varies much with coughing or speaking. These tumours are apt to be deeper and more diffuse than appearances would warrant, so that they are best left alone unless they give rise to serious symptoms. If bleeding occurs, it can be checked with the electric cautery. If there is threatening hæmorrhage,

* P. McBride, *Proc. Laryngol. Soc., London*, iv., Dec., 1896, p. 17.

S. G. Shattock, *Proc. Roy. Soc. of Med., Path. Section*, March, 1909, p. 285. (Gives full description, with picture, of a case, and notes of eight others which have been published.)

M. A. Goldstein, *Laryngoscope*, Sept., 1909. (A well-illustrated article, giving details of one case and full reports of twelve others recorded in literature.)

† O. Hirsch, *Wien. klin. Woch.*, xxi., 1908, No. 16, S. 592.

‡ Norris Wolfenden, *Journ. of Laryngol.*, 1888.

W. J. Bond, *Proc. Laryngol. Soc., London*, vi., Nov., 1898, p. 7.

distinguish a simple from an early malignant growth, but the following table indicates the chief points of difference :—

DIAGNOSIS OF BENIGN AND MALIGNANT NEOPLASMS
OF THE LARYNX

<i>Benign</i>	<i>Malignant</i>
Rare after 50.	Rare under 40 ; and generally occur over 50.
Occur on the anterior two-thirds of the vocal cords in the majority of cases.	A solitary growth on the ary-epiglottic folds, the epiglottis, or near the vocal processes, is very suspicious in patients over 45.
Grows away from the tissues.	Invades the tissues.
Base of growth, or cord it springs from, only inflamed during laryngitis.	Inflamed base.
May impair action of cord mechanically.	Any impairment due to infiltration is strongly suspicious.
No ulceration.	Tendency to ulceration.

Progress and prognosis.—After reaching a certain degree of intensity, symptoms may remain stationary for years. I have seen many innocent growths unaltered after ten or fifteen years, and some patients give a history which indicates that a laryngeal neoplasm has existed for thirty or more years.

Papillomata in adults do not tend to rapid growth, but in children they may be regarded as locally malignant, so rapidly may they recur. They may even grow down the trachea, and, if tracheotomy is performed, spread to the edges of the wound. But, on the other hand, they may slough off and be coughed up ; they tend to spontaneous atrophy and they may disappear after acute infectious diseases, and often after tracheotomy.

Asphyxia in children is a possibility which should not be forgotten. In adults, complete removal of an innocent neoplasm is not followed by recurrence, and the prognosis in relation to voice is good, although it may have to be somewhat guarded in very minute growths owing to the difficulty of complete removal. In children, prognosis in regard to voice is good if intralaryngeal removal can be employed.

Malignant degeneration of an innocent neoplasm may occur, but a collective investigation by Semon has demonstrated that it is of the greatest rarity, and one which is in no way influenced by intralaryngeal treatment.*

Treatment.—Some innocent growths, as already indicated, may, under certain conditions, be left alone. Among these are

* *Centralbl. f. Laryngol.*, vi., Dec., 1889, pp. 284-289.

Fig. 1.—Epithelioma of larynx, appearing in the form of a snow-white, sharply-pointed “meadow,” starting apparently from the left vocal cord, and extending to the ventricular band, arytenoid cartilage, and ary-epiglottic fold of the same side. (See p. 489.)

Fig. 2.—Simple granuloma originating in the scar left after removal of an epithelioma of the right vocal cord. (See p. 493.)

Fig. 3.—Epithelioma apparently involving the whole left vocal cord.

Fig. 4.—The tumour removed from the larynx shown in Fig. 3 was found, at the operation, to originate by a broad pedicle from the ventricle of Morgagni. The left cord, concealed by the growth, was quite healthy.

Fig. 5.—Papilloma on an inflamed vocal cord. This occurred in a patient over 60, and aroused suspicion of a possibility of malignancy. But the cord remained mobile, and the growth had not increased markedly when it was removed—three years after first coming under observation.

Fig. 6.—Tumour of left ary-epiglottic fold, presenting the clinical features of angioma, but, on removal, it was found that this appearance was brought about by an extravasation of blood, and that the growth was an epithelioma. (See p. 488.)

(Figures kindly lent by Sir Felix Semm.)

PLATE XV.

lung were found, without recurrence in the larynx which had previously been operated on.*

This freedom of the larynx is ascribed to the peculiar arrangement of the lymphatics within the larynx. Although very richly developed, they do not anastomose with neighbouring lymphatics, but form a network of their own which empties into two small glands on each side.†

Clinical classification.—It was proposed by Krishaber‡ to classify laryngeal cancers into—

(a) *Intrinsic*, i.e. arising from the vocal cords, the ventricles and ventricular bands, the interarytenoid region, and the subglottic area.

(b) *Extrinsic*, i.e. those growing from the epiglottis, arytenoids, aryepiglottic folds, the pyriform sinuses, and the pharyngeal surface of the cricoid cartilage.

(c) *Mixed*, i.e. a combination of extrinsic and intrinsic, in which class must be placed a large number of cases which only present themselves in an advanced stage.

This classification has been generally adopted on account of its clinical usefulness. For extrinsic cancer is “a dire disease.” § In it the glands are affected at an early period; the course of the disease is rapid, and it is seldom checked or cured by operation. Intrinsic cancer, on the other hand, is a much less hopeless form. It spreads slowly, does not infiltrate so rapidly, and in early stages is curable. So long as the disease is limited to the interior of the larynx it does not affect the lymphatic glands, and secondary growths are almost unknown. It is a fortunate fact that, according to some statistics, the intrinsic variety would appear to be the more frequent.

A cancer may originate in any part of the larynx, but the cords are the regions most frequently affected. This is fortunate, for a carcinoma tends to grow parallel to the long axis of the cord, and involve it for a large extent, before encroaching on surrounding parts.¶

Symptoms.—The early symptoms of a laryngeal cancer are

* Henry B. Sands, *N.Y. Med. Journ.*, i., 1865, p. 110.

Virchow, *Deut. med. Woch.*, xx., Juni 28, 1894, S. 52, v.

† M. B. Cunéo, *Gaz. des Hôp.*, 75^e Année, 13 Déc., 1902, No. 141.

D. Crosby Greene, *Trans. Amer. Laryngol. Assoc.*, 28th Congress, 1906, p. 63.

‡ *Gaz. Hebdom.*, xvi., 1879, p. 518.

§ Butlin, *Brit. Med. Journ.*, Aug. 23, 1890.

|| Semon, *Lancet*, Dec. 15-29, 1904.

Semon, *Brit. Med. Journ.*, Feb. 2, 1907, p. 241.

Chevalier Jackson, *Laryngoscope*, xix., Aug. 1909, No. 8, p. 587. (Of 141 cases the disease was intrinsic in 98 and extrinsic in 43.)

¶ F. Blumenfeld, *Zeitschr. f. Laryngol.*, Bd. iii., Heft 3.

way. Quite a small dose (gr. $\frac{1}{2}$) will be sufficient at first, but as the need for the drug or tolerance of it increases it should be given with no grudging hand. The neuralgic pains, particularly those spreading to the ear, may sometimes be checked by phenacetin, antipyrin, chloral, or other nerve sedatives.

Constipation and septic gastro-enteritis must be guarded against, and the general condition of the patient maintained by careful diet, nursing, and hygiene.

(b) *Palliative tracheotomy*.—This operation may have to be considered for the relief of respiratory obstruction in cases where the patient has declined more curative measures, and where the situation and stage of the growth render more radical measures hopeless. It should be performed as low in the neck as possible to avoid risk of the growth spreading to the tracheotomy wound. It should also be done early, as soon as any real difficulty in breathing is observed. If it is postponed till obstruction is very marked, infective bronchitis may have already started and be acutely aggravated by the operation

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- J. Molinié, "Les Tumeurs Malignes du Larynx." Paris, 1907.

Fig. 1.—Malignant disease of the larynx; first appearance as an irregular thickening of the left cord. This remained stationary for nearly two years, when it rapidly changed into the condition shown in the next figure.

Fig. 2.—Malignant disease of the larynx; later stage of the case shown in Fig. 1.* (*See* p. 488.)

* F. Semon, *Proc. Laryngol. Soc., Lond.*, 1893 (*Lancet*, 1894).

Fig. 3.—Laryngeal tuberculosis, simulating malignant disease. The diagnosis of malignant disease was supported by the age of the patient, viz. 70, and by the impaired mobility of the cord. (*See* p. 489.)

Fig. 4.—Extravasation of blood into and below the right vocal cord, simulating malignant disease of the larynx. (*See* p. 456.)

(*The above four figures are kindly lent by Sir Felix Semon.*)

Figs. 5 and 6.—Epithelioma of the larynx, involving all the right cord, the anterior commissure, and part of the left cord. Fig. 6 shows the appearance during phonation, and indicates the immobility of the right cord. Laryngo-fissure was performed, and it was then found that the granulation in the anterior commissure was due to invasion of the perichondrium, and that the disease had become extralaryngeal and was too advanced to be removed by this operation. (*See* p. 492.)

Fig. 7.—Epithelioma of the larynx. The disease was removed by laryngo-fissure, performed under cocaine, four years ago. The patient has no trace of recurrence, and has a useful rough voice. (*See* p. 492.)

the muscles are affected in the following order: (1) the abductors, i.e. the crico-arytenoidei postici (posticus paralysis); (2) the tensors, i.e. the thyro-arytenoidei interni; (3) the adductors, i.e. the crico-arytenoidei laterales. Unless, therefore, the lesion is so gross that complete paralysis occurs at once, the abductors are for a time the only muscles affected. In recovery from complete paralysis the reverse order is observed.

This greater vulnerability of the abductors is known as Semon's law, and to explain it he has suggested (1) "that there exists an actual difference in the biological composition of the laryngeal muscles and nerve-endings," and (2) that "similar differentiations exist in the nerve nuclei themselves." * But the ultimate cause of the greater vulnerability of the abductors is still unknown.

CLASSIFICATION

Neuroses of the larynx may be divided into three groups: (A) neuroses of sensation, (B) neuroses of motion, and (C) neuroses of inco-ordination.

A. Neuroses of sensation include anæsthesia, hyperæsthesia, and paræsthesia.

B. Neuroses of motion can be grouped as follows:—

(1) Spasmodic or hyperkinetic neuroses; exaggeration of normal activity. They include (a) glottic spasm, and (b) rhythmical clonic spasm of the adductors. Formerly authors included in this group congenital laryngeal stridor and laryngismus stridulus. The former is no longer regarded as a neurosis, and it will be seen that there are reasons for transferring laryngismus stridulus to another section.

(2) Paralytic or hypokinetic neuroses.

C. Neuroses of inco-ordination, or parakinetic neuroses. These deviations from the normal are not common. The group includes choreic movements, phonic spasm, nervous laryngeal cough, and laryngeal vertigo.

This classification is necessary for purposes of study, but some nervous diseases affect simultaneously both sensory and motor branches.

Another group might have been formed of diseases which are a perversion rather than an exaggeration or diminution of normal activity, and an affection like laryngeal vertigo is midway between troubles of sensation and motion.

* An exception to Semon's law is published by R. Saundby and J. T. Hewetson, *Brit. Med. Journ.*, March 12, 1904.

slowly and with much circumspection. If the anæsthesia is marked, deglutition becomes impossible, and the patient must be fed through a stomach tube. Owing to the insensitiveness of the larynx the tube might easily pass down the trachea. After its insertion, and before any food is introduced, this point should be settled by making the patient phonate or by examining him with a laryngoscope.

Iron, strychnine, or mercury and iodide of potassium should be given, according to the case. Diphtheritic cases should be kept at rest in bed, and the faradic current applied externally (*see* p. 676).

(b) HYPERÆSTHESIA AND (c) PARÆSTHESIA

Excessive or perverted sensation may be manifested by cough, pain, tickling, itching, burning, pricking, tightness, rawness, or the feeling of a foreign body, which induces hawking and hemming.

Etiology.—Among the causes are abnormal conditions of the general nervous system, as in anæmia, hysteria, neurasthenia, fatigue (physical, vocal, or mental), dyspepsia, and excess of alcohol. The phenomena accompany acute or chronic laryngitis, and are frequently met with at the menopause, in hypochondriacs, and in the victims of a dread of tubercle, syphilis, or cancer. A reflex cause may not uncommonly be traced in the tonsils, nose, ears, or teeth.

Diagnosis is based on the exclusion of any organic causes, such as gout, rheumatism, or early tabes. It should be remembered that, as Schadowaldt pointed out, the localization of sensation in this region is vague, so that the feeling produced by a tracheal, œsophageal, tonsillar, or postnasal lesion is often referred to the front of the larynx. Hyperæsthesia is perhaps most commonly met with as an early indication of tuberculosis, and next in frequency comes its association with hysteria, alcoholism, gout, and conditions producing local congestion.

Prognosis depends on the cause, and on the age, sex, and habits of the patient. These disorders of sensation may be very persistent, and sufferers frequently fall victims to quackery.

Treatment.—It is well to avoid much local treatment, especially the use of the galvano-cautery and cocaine. A sedative lozenge containing carbolic, menthol, bromide, or krameria may be given. It is important to give the patient confidence, reassure him as to the absence of local lesions, and insist on the necessity of general treatment together with attention to diet, hygiene, exercise, and baths. Tonics of iron or arsenic (Formula 58), change of air, local massage, the use of the constant current, may prove useful,

A few hurried, shallow, noisy inspirations are drawn with increasing stridor and difficulty and then either continue more slowly, laboured and stridulous, or else culminate in complete closure of the glottis, during which the agonized expression of the patient presents many of the symptoms of asphyxia. The glottis may partially open from time to time to allow of shallow respiration. Complete unconsciousness seldom occurs, although it may be feigned in hysterical subjects. In many cases the patient is able to converse, and he uses his utmost effort to follow directions to overcome the spasm by taking quiet, rapid, shallow, and regular inspirations. At night the attack is apt to be more alarming, as the patient generally springs from bed to clutch on to some object and exclaim, between his noisy efforts at filling his lungs, that he is choking. When associated with a peculiar brassy cough, attacks of glottis-spasm in a patient who is not hysterical should suggest the possibility of an early condition of aortic aneurysm or mediastinal growth.

There is a more chronic form in which inspiratory stridor is more or less constant except in sleep, with exacerbation under any physical exertion or any emotional disturbance such as a laryngoscopic examination. The cords are then seen during inspiration to remain in close proximity, and the appearance might be mistaken for double abductor paralysis. In reality it is produced by adductor or inspiratory spasm. To detect this the patient should be requested to phonate as long as possible without stopping; the need of air will make him take a deep respiration, when the cords will be seen to abduct widely. The patient sometimes eludes this test, and then the only plan is to administer a general anæsthetic and observe the movements of the cords by direct laryngoscopy (p. 44).

Prognosis depends on the cause. The affection is seldom fatal in itself; and tracheotomy, though often threatened, is rarely required.

Treatment.—The attacks may be mitigated by inhaling chloroform or nitrite of amyl. I have had some glass ampoules prepared containing chloroform (℥x), menthol (gr. ½), and iodide of ethyl (℥v). These can be always at hand, and, when required, the glass is readily broken and the contents inhaled. In functional cases the revulsive effect of strong smelling-salts, cold affusion, and suggestion will prove useful. The patient should be ordered to keep the mouth closed and to breathe quietly through the nose.

Between the attacks the exciting cause must receive appropriate treatment. In all cases any source of irritation, such as dust, alcohol, tobacco, indigestion or excitement, should be avoided.

an exception, that the paresis is functional and not organic. It is therefore easily remembered that when the adductors are alone affected we have to do with functional disease; but that when the abductors are first involved the affection is organic.

For clinical convenience, therefore, paralysis of the adductors will be first considered.

A. Paralysis of the Adductors of the Vocal Cords

Adduction of the vocal cords is brought about chiefly by the action of the crico-arytenoidei laterales (p. 500, Fig. 224, A). For complete approximation the arytenoideus and thyro-arytenoidei must also contract (Fig. 224, B).

i. Unilateral Adductor Paralysis

This form of adductor paralysis, which can only be brought about by purely local causes—would produce an appearance similar to that shown in Fig. 233, p. 521. It will be observed that the condition would be liable to be mistaken for complete paralysis of one cord. If the adductor paralysis were complete, then the over-action of the crico-arytenoidei postici would maintain the cord in complete abduction, with a concave border. But if incomplete, some further abduction would take place on deep inspiration.

It is extremely rare. It is said to have arisen from cold, syphilis, enteric, typhus, and smallpox. Mackenzie observed unilateral adductor paralysis in a case of lead-poisoning. But unilateral want of adduction is, practically, only produced by local causes.

ii. Bilateral Adductor Paralysis

Synonyms.—*Functional aphonia*; *hysterical aphonia*; *nervous aphonia*.

Etiology.—Functional aphonia, in the majority of cases, is due to hysteria, and occurs chiefly in young women, sometimes in girls as early as 8, but typical cases may be met with in boys under 10 and in healthy adult men. Anæmia, general weakness, neurasthenia, and local inflammatory conditions of the larynx conduce to it. A reflex stimulus, when it acts on an hysterical type, may originate an attack. It is then attributed to sudden emotion, fright, mental or physical shock, menstruation, pregnancy, uterine disease, disorders of digestion or intestinal worms. It has been attributed to cold or the inhalation of certain odours. When a person is "struck dumb" with fright, anger, joy, or grief, the condition is one of aggravated functional aphonia, combined with paralysis of the whole speech mechanism. In "hysterical mutism," as this is called, the patient cannot even whisper.

remember that functional adductor paralysis, without any perceptible change in the larynx beyond anæmia, not infrequently occurs in incipient tuberculosis.

Organic paralysis of the adductors may occur in the later stage of recurrent paralysis. In that case it is preceded by palsy of the abductor muscle, and may be unilateral, or bilateral, or complete. Otherwise adductor paralysis is always (*a*) myopathic or (*b*) functional, and then is rarely complete, and in the functional form is never unilateral.

Prognosis.—Generally speaking, complete aphonia coming on suddenly will disappear or can be cured suddenly. Whereas an incomplete aphonia coming on slowly is slow in getting well.

Treatment.—The cure of functional aphonia is best effected by suggestive treatment. The patient should be kindly but authoritatively told that her disease is quite curable, and that her voice will soon be restored, as its loss only depends on weakness of the vocal cords. With the laryngeal mirror in position she should be asked to take a few deep breaths, then to fill the chest well and make some loud expiratory noises, and then to cough repeatedly. During a little pause, she should be informed that it is seen that her voice is rapidly returning. The mirror is then reintroduced, and the procedure repeated, terminating, if possible, with the emission of the vowel *E*. As soon as this is effected, the mirror is removed, and the patient firmly requested to count aloud up to ten.

If this scheme, even on renewal, fails, I have frequently obtained success by using a little chloride of ethyl to spray the front of the neck and each side of the larynx before repeating the manœuvres—the effect is doubtless entirely due to suggestion.

If the case is still obdurate, the next step is to state that now it is necessary to make an application to the vocal cords. A laryngeal brush is dipped in some astringent, such as perchloride of iron, nitrate of silver, or chloride of zinc, and the larynx swabbed out. The patient is encouraged to phonate during the subsequent spasm. This treatment should be repeated once or twice a week, but a certain dread of it will prevent a relapse. Even if not successful on the first occasion, it should be persevered with at subsequent sittings, since, combined with general measures and the acquisition of the patient's confidence, it will as a rule finally prove successful.

Should the paralysis persist after a thorough trial of the above measures, recourse must be had to faradism. One electrode is placed over the episternal notch, while the other is applied alternately to the sides of the larynx. It is well to start at once with a fairly strong current, as the sudden mental shock appears

(d) Peripheral neuritis.

(e) Myopathic inflammation.

Finally, mechanical fixation of the crico-arytenoideus posticus must be kept in mind, as its phenomena, especially in unilateral lesions, closely resemble true paralysis.

These points will now be examined in order :—

(a) **Cortical lesions.**—Nothing positive is known of any cortical cause of posticus paralysis. It has been pointed out that it would require a bilateral and identical lesion involving the cortical centres or the motor fibres passing from them to the medulla in order to produce this result. Such a pathological occurrence is never likely to arise, and not a single case has been described (cf. p. 503).

(b) **Bulbar lesions.**—These paralyses, particularly of the vagus nucleus, are practically the only central paralyses met with. The posticus or abductor muscle may be affected in the following bulbar conditions :—

Vascular lesions such as thrombosis, hæmorrhage, and embolism. Syphilitic gummata. Tumours, aneurysm, and abscess, compressing the bulb. Diphtheria. General paralysis. Glosso-labio-laryngeal paralysis. Locomotor ataxia (in bulbar form). Disseminated cerebro-spinal sclerosis. Amyotrophic lateral sclerosis. Syringomyelia of the bulb (i.e. syringo-bulbia).

(c) **Lesions of motor fibres in the vagus trunk or recurrent laryngeal.**—These include—

Pressure and direct traumatic or operative injury of the vagus or its recurrent branch (e.g. in ligature of vessels).

Intracranial growths at the base of the brain.

Growths in the neck involving the vagus close to its exit from the skull.

Aneurysm of the internal carotid.

Cervical phlegmon.

Goitre.

Pericarditis (for left recurrent nerve).

Pleural thickening at the apex of the lung (more for right nerve).

Aneurysm of the arch of the aorta (especially for the left nerve); of the innominate artery (for the right); of the left subclavian or carotid arteries.

A dilated left auricle may produce unilateral paralysis by pressure on the left recurrent laryngeal nerve. The nerve is flattened against the aorta either by the dilated left auricle or by the pulmonary artery which is forced upwards by cardiac enlargement. Some 37 cases of this rare complication of mitral disease have been

It is important not to mistake for paralysis the appearance of a cord which is mechanically impeded in its movements. Thus, a cord may be prevented from acting by a growth in the interarytenoid space or in the ary-epiglottic fold (Plate XIII., Fig. 4); or its movements may be sluggish owing to infiltration in its own layers (Plate XIII., Fig. 3, and Plate XVI., Figs. 5 and 6), or in the soft tissues adjoining (Fig. 255, p. 643). In the early stages of these latter conditions it will be noticed that the movements are impaired in both adduction and abduction; and, by the time the cord is more fixed, the causative formation is generally quite evident.

More difficulty is encountered in distinguishing ankylosis of the crico-arytenoid joint from complete recurrent hemiplegia, but diagnosis is generally possible by attention to the following points:—

DIAGNOSIS OF PARALYSIS OF THE RECURRENT LARYNGEAL NERVE, AND ANKYLOSIS OF THE CRICO-ARYTENOID ARTICULATION

Paralysis

No swelling.

The arytenoid cartilage on paralysed side is, during phonation, pushed aside by the sound and over-adducted healthy cord. (As a paralysed cord in time gets fixed, from disuse, this diagnostic point has a greater positive than negative value.)

The cord is fixed in the middle line or in the cadaveric position.

If the interarytenoid muscle retains any power, and twitches the arytenoid cartilage on the paralysed side slightly inward and forward, it shows the passive mobility of the articulation, and is a reliable means of excluding joint disease (Grünwald).

If the position of the cord is at first median and then cadaveric it is due to a nerve lesion.

Ankylosis

May have some obvious swelling around crico-arytenoid joint.

The active arytenoid cartilage approaches, but does not displace, that on the affected side.

Any excursion of movement is incomplete.

If the cord is quite immobile, its fixation may not correspond in position with any recognized form of laryngeal palsy.

Jerky movements of the cord.

relieve the stenosed air-way. The idea has only been put into practice in the case of "roaring" horses, but has proved quite useless. This condition of "roaring" can be relieved by "ventricle-stripping"—an operation which is not suitable for human patients, as it entails complete loss of voice.*

DIFFERENTIAL DIAGNOSIS OF THE CAUSES OF LARYNGEAL PARALYSIS

Laryngeal paralysis as a symptom not only affords information as regards local conditions, but it is also an aid to the diagnosis, prognosis, and treatment of diverse processes. In many of these it may be the one conclusive point of evidence; in others it may for some time be the only objective indication of various possibilities.

It should be first determined that there is real paralysis and not a mechanical interference with the mobility of the vocal cord (p. 524).

The laryngoscopic condition most frequently seen in paralysis is one of the following:—

1. The cords abduct normally, but fail to meet on phonation (= bilateral paralysis of the adductors).

2. The cords adduct completely, but, on deep inspiration, one cord fails to abduct beyond the cadaveric position (= unilateral abductor paralysis) (Fig. 232, p. 521).

3. One cord is immobile in the cadaveric position (= unilateral recurrent paralysis) (Fig. 233, p. 521).

4. Immobility of both cords in a more or less adducted position (= bilateral abductor paralysis).

1. *Bilateral paralysis of the adductors* is, as we have seen, generally hysteric (p. 512). It might possibly be diphtheritic, and in that case the history, and any associated paralysis of the soft palate, would assist the diagnosis.

2. *Unilateral abductor paralysis* is, in the large majority of cases, the consequence of pressure on one recurrent laryngeal nerve or the vagus trunk (see list of causes at p. 518). This pressure should first be carefully sought for in the neck in the form of goitre, enlarged glands, or malignant disease of the œsophagus. If the examination of the neck is negative, the cause may be found in the chest. Tumours of the mediastinum and aneurysm of the aorta are very apt to be latent, and if a bulbar as well as a cervical lesion can be eliminated, the possibility of pressure in the chest must be maintained, particularly in left-sided lesions. In many

* F. Hobday, *Proc. Roy. Soc. Med.*, Laryngol. Sec., iv., No. 6, April, 1911, p. 87.

inhibitory centre), and if (2) there is involvement of other cerebral nerves—ocular, palatal, lingual, or pharyngeal.

Paralysis may be more marked on one side than on the other, e.g. one cord may be quite fixed in the cadaveric position, while the other only fails to abduct normally, although, on phonation, its power of adduction is still retained. This shows that the destructive lesion involving the recurrences, the vagus, or the bulbar centres, is more advanced on one side than on the other.

Finally, in double abductor paralysis, it is only after carefully excluding central or trunk affections that the various possible causes of peripheral neuritis need be sought for.

Often the cause of recurrent paralysis cannot be positively ascertained in life. In 150 cases examined by Avellis it could only be determined in 85.

In addition to the above four types of laryngeal palsy, we may note that paralysis of the crico-thyroid muscle, especially occurring alone, is extremely rare (p. 509).

Paralysis of the interarytenoideus or of the internal thyroarytenoideus may occur alone. It may be difficult to determine the cause. It may result from exaggerated vocal efforts, laryngitis, neurasthenia or hysteria, and may precede the onset of tuberculosis. It may also be due to diphtheria.

A spasmodic laryngeal cry may take the place of the cough, otherwise the conditions are the same. In one case a boy of 11 emitted a sudden explosive cry, not resembling any vowel or word, but not unlike a milkman's cry. It recurred at irregular intervals of 12 seconds to 1½ minutes, and was said to persist in sleep. With one interval of 3 minutes this cry had gone on for 18 months.*

Diagnosis.—This "tic convulsif" is distinguished from other coughs by its solitary explosion, sudden onset, absence of expectoration, and preservation of voice. There is neither the preliminary deep inspiration, nor the subsequent shortness of breath, which occurs in the cycle of a true spasmodic cough.

Treatment.—Some cases of nervous cough may be traced to nasal or pharyngeal irritation. If adenoids or tonsils are present, they should be removed; but a cure should not be promised, as the cough may persist and require treatment by attention to general health, hygiene, air, baths, and exercise. Breathing and movement exercises are often beneficial. Iron, arsenic, strychnine, maltine or cod-liver oil are more useful than chloral and the bromides, which should only be given to quiet marked irritation. Hypnotism, change of air, and sea voyages have been recommended, and faradism and high-frequency currents will often prove beneficial.

LARYNGEAL VERTIGO

Synonyms.—*Laryngeal ictus*; *laryngeal syncope*.

Laryngeal vertigo is neither a distinctly sensory nor a distinctly motor disturbance, but transitional between the two.

When Luc's monograph was written (Dec., 1892), only about twenty authentic cases had been published, so that it is a rare as well as a curious form of spasm of the larynx.

Etiology.—The affection is mostly met with between the ages of 35 and 70. The causes producing the irritation of the larynx are quite unknown. Tobacco and alcohol are frequent predisposing causes; the arterio-sclerotic furnish a number of subjects; and cases are common amongst those whom French authors term the "arthritic." Cases have been described as a manifestation of pertussis in adults (Avellis). They are sometimes confused with the laryngeal crises of tabes.† The attacks are influenced in frequency by the state of the atmosphere, and by exposure to such irritants as tobacco smoke.

* J. W. Bond, *Proc. Laryngol. Soc., London*, iii., May, 1896, p. 80.

† *Proc. Roy. Soc. Med., Laryngol. Section*, Nov., 1905, p. 16.

LARYNGEAL SYMPTOMS IN INTRATHORACIC ANEURYSM AND CERTAIN CHRONIC DISEASES OF THE NERVOUS SYSTEM

Radiography has taught us that aneurysms are more frequent than was formerly supposed, and the laryngologist is in a favourable position to diagnose an aneurysm of the arch of the aorta.

So valuable also are the laryngeal manifestations in certain diseases of the nervous system that it seems well to consider them briefly.*

THE LARYNGEAL SYMPTOMS OF INTRATHORACIC ANEURYSM

The chief are (1) cough, (2) attacks of dyspnœa, and (3) alterations in voice, and are due to irritation or pressure on the pneumogastric nerves or their recurrent laryngeal branches. Bearing in mind the course of these nerves on each side (p. 502), it is obvious that the left recurrent is more exposed to pressure from aortic aneurysm than is the right. Still less frequently is it possible for an aneurysm to cause compression on both sides.†

The symptoms will vary as the aneurysm presses on (a) a recurrent nerve, i.e. a nerve containing only centrifugal motor fibres; or (b) the vagus nerve itself, i.e. a nerve containing centripetal fibres as well as centrifugal motor fibres.

(a) Irritation of a recurrent laryngeal nerve will produce spasm or paralysis of the corresponding cord according to the degree and continuance of the pressure. In the first case, probably all the muscles on one side of the larynx are irritated, and there may be occasional and not severe dyspnœa, owing to the freedom of the unaffected cord. In the second case, when the pressure is sufficient to cause paralysis, the first muscle affected is the abductor, as explained by Semon's law on p. 503. This may not be accompanied by any change of voice, or dyspnœa, in quiet respiration (Fig. 232, p. 521). But with progressive and continuous pressure the internal tensors on the same side become paralysed (Fig. 233, p. 521). As already explained, this condition is the cause of fatigue of the voice, which becomes weak, wanting in tone, altered in pitch, rough, and with a tendency to "crack" suddenly into a falsetto; there may also be "phonative waste." Catarrh, possibly consequent on laryngeal irritation or pressure of the aneurysm on a bronchus, adds to the alterations of voice. There may be no dyspnœa in quiet respiration. The symptoms at first may be intermittent, and even a complete recurrent paralysis may disappear.‡

(b) Pressure on a vagus trunk produces different results. At first

* Moritz Schmidt, *Ann. des Mal. de l'Oreille*, 1899, No. 5, 162.
Collet, *Rev. de Laryngol.*, xx., ii., 1900, No. 33, p. 203.

† Deygas, Thèse de Lyon, 1902.

Revol, *Ann. des Mal. de l'Oreille*, xxx., 1904, No. 2, p. 162.

‡ Landgraf, *Rev. Hebd. de Laryngol.*, xx., ii., 1900, No. 48, p. 651.

1. Disturbances of sensation:—Anæsthesia, paræsthesia, hyperæsthesia of the larynx, often referred to as tickling, irritation, tightness, or a sensation of choking.

2. Inco-ordination of muscles:—The voice becomes thick and jerky owing to ataxic movements of the cords.

3. Spasmodic attacks:—Laryngeal crises often occur in the early stage and may precede other physical signs of the disease by three years.* They tend to disappear as abductor paralysis sets in.

An attack is announced by a feeling of irritation or tickling in the throat, followed by cough and a sensation of choking, caused by the spasmodic closure of the glottis, so that the patient rapidly asphyxiates, and falls down unconscious. The fall is sometimes averted by the glottis suddenly opening and allowing air to be drawn into the chest with difficulty, to the accompaniment of a long-drawn whoop. Unconsciousness may last from a few seconds to a few minutes, and is followed by a sense of mental confusion.

4. Paralysis of the cords, unilateral or bilateral, and primarily affecting the abductors.

In 84 cases of laryngeal paralyses in ataxy, Burger found abductor paralysis, bilateral, 46 times, and unilateral 11 times; paralysis of abductor and of thyro-arytenoideus muscles, 8 times; complete recurrent paralysis in 6 cases.† Dorendorf found paralysis in 12 per cent. of tabetics, and crises in 3 per cent., while 3 per cent. showed jerky or ataxic movements of the cords.

Prognosis.—The laryngeal crises and spasmodic attacks vary much in intensity and frequency. They seldom cause death by asphyxia, but their occurrence exposes the patient to anxiety, and the risk of an attack in some public or dangerous position. Disorders of sensation require caution in eating and drinking. These spasmodic disorders are more frequent in the earlier stages, and tend to disappear with the progress of the disease.

Paralyses may appear early, even years before the other symptoms of tabes, and are permanent and generally progressive.

Treatment.—These complications require the adoption of self-evident precautions. The attacks may be cut short by a cocaine spray, or the inhalation of nitrite of amyl (Watson Williams). The treatment of the paralysis is referred to at p. 525.‡

Disseminated sclerosis.—Palsies are rare. Anæsthesia of the larynx and palate may be complete.§

Glosso-labio-laryngeal paralysis.—Abductor paralysis may occur, and anæsthesia of the larynx is not uncommon. The affections of the tongue and soft palate in this disease are well known.

Myotonia atrophica.—Three cases have been recorded, with laryngeal paralysis.¶

Syringomyelia.—Anæsthesia and abductor paralysis are often

* C. A. Parker, *Proc. Laryngol. Soc., London*, iii., 1895-6, p. 46.

† Quoted by S. Moritz, *Journ. of Laryngol.*, 1894, viii. 374.

‡ S. Moritz, "The Laryngeal Manifestations of Locomotor Ataxy," *Med. Chron.*, May, 1894.

H. Dorendorf, "Larynx-Störungen bei Tabes." Berlin, 1903. (An elaborate monograph, with epitome of the literature to date.)

§ F. E. Batten and W. J. Horne, *St. Bartholomew's Hosp. Repts.*, vol. xxxii.

W. Freudenthal, *Journ. Amer. Med. Assoc.*, June 13, 1908, p. 1966.

¶ H. Clayton Fox, *Proc. Roy. Soc. Med., Laryngol. Sect.*, iii., Nov., 1909, p. 20.

present. There may be paralysis of the palate and pharynx, and chronic rhythmical spasm of the summit of the arytenoid.*

General paralysis of the insane.—Thirty-four cases were examined laryngoscopically by Permewan.† In nearly all these cases, in the second and third stage, there was diminished sensation in the pharynx and larynx. In 2 cases there was hyperæsthesia of the pharynx. In 7 there was more or less complete palsy of abduction of one or both vocal cords.

* Jobson Horne, *Proc. Laryngol. Soc., London*. iv., June, 1897, p. 104.

H. Tilley, *ibid.*, vi., Dec., 1898, p. 21.

† W. Permewan, *Journal of Laryngol.*, ix., Feb., 1895, p. 109.

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CHAPTER XL

STENOSIS OF THE LARYNX. ANKYLOSIS OF THE CRICO-ARYTENOID ARTICULATION

STENOSIS OF THE LARYNX

Synonym.—*Laryngeal stenosis.*

Narrowing of the larynx can only be correctly studied by reference to the various pathological conditions which cause it. But it may be convenient, even if it necessitate some repetition, to consider the subject as a whole, giving special consideration to the stenosis that not infrequently remains when the morbid process which inaugurated it is either past or stationary.

Etiology.—Acute laryngeal stenosis may occur in any of the affections which produce œdema of the larynx (*see* p. 446). It is met with in syphilis, wounds, scalds, injuries, foreign bodies, acute laryngitis, septic inflammations, diphtheria, membranous laryngitis, the exanthemata, and other acute phlegmons of the larynx. It has been known to occur quite suddenly in chronic tuberculous laryngitis. The symptoms of sudden, but temporary, stenosis are the leading feature of laryngismus stridulus and laryngeal spasm.

Stenosis may arise gradually in the course of tubercle, lupus, syphilis, leprosy, scleroma, simple or malignant new growths, perichondritis, wounds or injuries.

It may be due to congenital webs, congenital laryngeal stridor, adhesions between the cords, or recurrent laryngeal paralysis. If a tracheotomy is performed too high (when it often is really a cricotomy, or even a laryngotomy) it frequently leads to stenosis by interference with the action of the vocal cords. The too prolonged wearing of an intubation tube may lead, by pressure, to ulceration and stenosis—generally at the lower end in the neighbourhood of the cricoid cartilage. Statistics show that about 1 per cent. of patients intubated for laryngeal diphtheria are subsequently unable to breathe without an intubation or tracheotomy tube, generally as a result of chronic subglottic laryngitis.*

* J. Rogers, *Amer. Journ. Med. Sci.*, cxxv., No. iv.

resolution. In the acute form this will depend entirely on the cause. It is serious if due to diphtheria, or to the impaction of a foreign body. When malignant disease or tuberculosis is so advanced as to cause stenosis, relief by tracheotomy is required. In chronic stenosis there is no tendency to spontaneous recovery, and, if progressive, it inevitably leads to death by asphyxia. Treatment, however, will not only avert this, but in many cases will remove all further risk of it, although the cure of the actual stenosis in the larynx is notoriously unsatisfactory.

Treatment.—For the treatment of the acute form, reference must be made to the chapters dealing with the affections which cause it (pp. 432, 437, 445, 446, 676).

The treatment of the chronic form will also depend to a large extent on the pathological conditions, and advice should be sought under the various sections describing them. Speaking generally, the three chief methods of relief are by medication and intra-laryngeal treatment, by intubation, and by tracheotomy.

The frequency with which stenosis follows syphilis of the larynx forms the most earnest plea for careful and complete treatment of the first symptoms of the disease in this region. But even when stenosis is threatening, and surgical relief appears almost inevitable, it is remarkable how the symptoms will sometimes abate if active mercurial treatment is carried out by inunctions, or fumigations, or hypodermic injections. When the dyspnœa demands immediate relief, this should always be secured by the performance of a tracheotomy. The physiological rest which is thus secured for the larynx not only helps to spontaneous resolution of the inflammatory products there, but renders specific treatment much more effective.

If the stenosis is due to bilateral abductor paralysis, this might be temporarily relieved by intubation, but for a permanency it is more desirable that the patient should wear a tracheotomy tube.

The stenosis resulting from other cicatricial conditions may be overcome by the use of a suitable intubation tube, which may be left *in situ* for months at a time.* A fibrous stricture apparently requires at least two years of continuous dilatation to the utmost limit of the normal lumen of the respiratory tract before it can be considered as permanently overcome. Three to six years of dilating tubage have been required in some cases.† An intubation tube of hard rubber—which is preferable to metal for prolonged

* John Rogers and Bryson Delavan, *Trans. Amer. Laryng. & Assoc.*, 1905.
Emil Mayer, *N.Y. Med. Rec.*, Dec. 25, 1909.

† D. Bryson Delavan, *Journ. of Laryngol.*, XLIV., 1909, No. 11, p. 585.
StClair Thomson, *Proc. Roy. Soc. Med., Laryng. & Section*, vol. III., Dec., 1909,
p. 35.

patient and practitioner, that it should be reserved for selected cases, and for those in which a cure cannot be expected from intubation. Of 37 patients treated by laryngo-tracheostomy, 6 died—a mortality of 16·3 per cent. Of the remaining 31, only 14 were considered entirely cured (Delsaux).

ANKYLOSIS OF THE CRICO-ARYTENOID ARTICULATION

The crico-arytenoid joint possesses a loose capsule, and stiffness in or around the joint is not so exceedingly rare. The ankylosis may be true or false. It may result from comparatively simple causes, and be present in an otherwise healthy subject.

Etiology.—Fixation of this joint has been attributed to perichondritis from syphilis or gout. These affections more commonly impair the movements of the joint by deposits outside the capsule, as do cancer, syphilis, tuberculosis, and pachydermia. Blows, fractures, strangling, cut-throat, and traumatism may lead to false ankylosis. Acute local inflammation induces it, and so it may be consequent on acute pharyngitis, tonsillitis, diphtheria, enteric, and the exanthemata.

The joint is apt to be implicated in rheumatism, and if it is the only articulation affected, the symptoms may be mistaken for those of acute perichondritis. Rheumatic crico-arytenoid arthritis may be acute or subacute. If acute, there is always pyrexia, the condition is generally bilateral, and other joints are affected. If subacute, there may be no pyrexia, and the arthritis is almost always unilateral. The crico-arytenoid may be the first joint to be attacked in acute rheumatism, or it may be involved simultaneously with, or later than, the others, or during a relapse. In all acute cases there is dyspnœa, and the necessity for tracheotomy may appear urgent.* It is possible that gonorrhœal rheumatism may attack this joint.

In recurrent paralysis of the cord of some standing, the crico-arytenoid joint becomes ankylosed from disuse.

Symptoms.—The attack will vary with the nature of the affection causing it. The voice varies; if the cord is fixed in the median position, it may hardly be altered; if in the cadaveric position, it may be impaired. If the affection is bilateral, the voice is rough or hollow, but is not necessarily lost, although dyspnœa in such cases is marked, and in acute conditions may produce rapid asphyxia. When unilateral, breathing is easy, except temporarily when there is any congestion of the larynx. There may be pain and stiffness referred to the side of the larynx, with slight discomfort in swallowing.

Examination.—The ankylosis of the crico-arytenoid joint is chiefly manifested by the fixation of the vocal cord. This may occur in any position, according to the limiting lesion. It is usually in the cadaveric position (Fig. 223, p. 500), or anywhere

* E. Baumgarten, *Wien. med. Woch.*, Oct. 17, 1903. No. 42, S. 1970.

PART VII.—DISEASES OF THE TRACHEA AND ŒSOPHAGUS

CHAPTER XLI

DISEASES OF THE TRACHEA

Anatomical considerations.—The trachea extends from the lower part of the 6th cervical to the 4th dorsal vertebra. It is about $4\frac{1}{2}$ inches in length. Being surrounded by loose connective tissue, there is a good deal of up-and-down movement allowed to the tube in breathing and swallowing. This mobility is more marked in children than in adults. The distance from the cricoid cartilage to the top of the sternum also varies with the length of the neck and position of the head. In an adult the full distance is about $2\frac{3}{4}$ inches (7 cm.); in a child it varies between $1\frac{1}{2}$ inches (4 cm.) for a child of 3 to 5 years, and $2\frac{1}{4}$ inches (6 cm.) for a child of 8 to 10 years.

The extreme width is frequently given as between $\frac{3}{8}$ inch and 1 inch. But the researches of Nicaise and Lejars have shown that the diameter of the trachea is very different in life from what it is in the cadaver. Instead of being 16.7 mm. at the first ring and 18 mm. at the ninth, the diameters in the living subject are respectively 12 mm. and 11.8 mm.—a width of about $\frac{1}{2}$ inch.

A rough estimate of normal measurements, according to Bryson Delavan, is obtained by a comparison with the patient's index finger, which is somewhat near the calibre of his trachea below the cricoid. The length of this finger is about the distance from the suprasternal notch to the tracheal bifurcation.*

Examination.—The method of viewing the trachea with the laryngeal mirror has been described at p. 36. The portion of the trachea just below the glottis is the least visible, owing to the narrowing of the subglottic region and the shadow thrown by the vocal cords. In some cases one or more of the tracheal rings are exceptionally white and prominent. This physiological condition must not be mistaken for true calcareous excrescences.† Direct tracheoscopy is described at p. 46.

Abnormalities are uncommon. The rare congenital defect in

* *Trans. Amer. Laryngol. Assoc.*, 1905.

† E. Law, *Brit. Med. Journ.*, Aug. 30, 1902, p. 571, or *Journ. of Laryngol.*, Oct., 1902.

A. Intrinsic causes:—

1. Cicatrices and adhesions of traumatic, operative, or inflammatory origin.
2. New growths.
3. Foreign bodies.
4. Tertiary syphilis, leprosy, scleroma, tuberculosis.
5. Œdematous inflammation, including the consequences of inhalation of smoke and volatile fumes, or the aspiration of corrosive chemicals and acids.
6. Injuries and wounds.
7. Penetration into the trachea of caseous lymphatic glands, aneurysms, thyroid tumours, and malignant growths in the neighbourhood.

These causes are met with more rarely than the extrinsic ones.

B. Extrinsic causes:—*(a) Compression in the neck :*

1. Goitre (the most common cause).
2. Enlarged glands and new growths (innocent or malignant) in the neck.

(b) Compression in the thorax :

1. Substernal goitre ("goitre plongeant").
2. Enlarged or tuberculous glands.
3. Enlarged thymus gland. Abscess of thymus gland.
4. Aneurysm.
5. Cervical phlegmon and abscess.
6. Foreign bodies impacted in the œsophagus.
7. Bone disease extending from the sternum, clavicle, or vertebræ.
8. Traumatism, as in fracture or rupture of the trachea, cut throat, strangulation.
9. Subcutaneous emphysema arising in cut throat or injury.
10. Growths of the œsophagus.
11. Malignant growths of the mediastina (more apt to compress the bronchi).

A. Intrinsic causes.—The cicatrices and adhesions causing stenosis in the trachea are, in the large majority of cases, the sequelæ of tertiary syphilis (Fig. 256, p. 644). Next in importance come the results of tracheotomy and intubation. New growths are considered on p. 550.

Foreign bodies entering the trachea by the mouth are referred to on p. 695. In addition, the windpipe may be penetrated by morbid processes and allow the ingress of foreign substances through its walls. Thus a caseous broncho-tracheal gland may ulcerate through into the lumen of the windpipe, and cause death by slow dyspnœa* or by sudden asphyxia † (Fig. 261, p. 696).

Tertiary syphilis does not cause stenosis nearly so often by gummatous proliferation as by the subsequent cicatricial stenosis.

* Bransby Yule, *Brit. Med. Journ.*, Aug. 19, 1905, p. 385.

† G. Herbert Metcalfe, *Lancet*, May 25, 1901, p. 1405.

stenosis more frequently than any intrinsic cause, and of all external causes the most common is goitre (Figs. 234 and 235). Invasion of the trachea does not depend on the size of the thyroid enlargement, but on the situation and nature of the hypertrophied portion. The trachea may be narrowed to a scabbard-like slit, and its walls be quite softened. This condition impels the patient to carry his head in a more or less fixed attitude, and if this is abandoned (as in sleep) death may occur suddenly. The thyroid growth may also compress the œsophagus and involve the recurrent laryngeal nerves (*see* p. 517).

The approximate weight of the average thymus gland is 13·26 gm. in newly born children, 23 gm. between the ages of 5 and 10, 26 gm. between 6 and 10 years, and 37·52 gm. between 11 and 15 years. After that age it rapidly diminishes until it weighs only 6 gm. in advanced life.* A gland has been found in the post-mortem examination of a child of 1½ years to weigh 14 drms. (50 gm.),† and in a boy of 13 I have seen one weighing 56·7 gm. (2 oz.). In a child aged 8 months it has been found converted into an abscess the size of a small apple.‡

An enlarged thymus may produce symptoms by causing tracheal stenosis, or by producing circulatory disturbances from pressure on the large vessels, or by toxic effects. It is possibly one overlooked cause of the sudden deaths in infants which are sometimes attributed to overlaying.§

With the aid of direct tracheoscopy Chevalier Jackson has been able to demonstrate that the so-called "thymic asthma" is really a mechanical compression of the trachea, which was reduced to a chink of 1 to 2 mm. The dyspnœa from this stenosis increased with expiration and on sitting erect. Complete cure was effected by removal of the thymus gland.||

Symptoms of tracheal stenosis.—If tracheal obstruction comes on gradually, a degree of stenosis can be tolerated which would cause asphyxia if it occurred suddenly (compare Laryngeal Stenosis, p. 536). There are three stages of symptoms: 1. Respiration is free, except for laboured respiration on physical exertion. 2. There is continuous and well-marked noisy respiration, and the voice is weak. 3. There are, in addition, paroxysms of suffocation. In slowly progressive stenosis the onset of dyspnœa is

* Hammar, *Vierteljahr. f. Gerichtl. Med.*, Bd. xxxvii., Heft 1.

† James Rooth, *Brit. Med. Journ.*, March 21, 1906, p. 737.

‡ H. Cohn, *Deut. med. Woch.*, Aug. 30, 1906, p. 1418.

§ G. Avellis, *Arch. f. Laryngol.*, Bd. viii., Heft 1.

L. S. Dudgeon, *Trans. Path. Soc., London*, Dec. 1, 1903.

|| *Journ. of Amer. Med. Assoc.*, xlviii., May 25, 1907, p. 1753.

come extensions from the larynx; and, lastly, those situated midway between these points. Syphilitic ulceration and stenosis may extend into the main bronchi.* Complications occur from perforation of the œsophagus, aorta, pulmonary artery, or vena cava; but the most common sequela is stenosis.

Syphilitic ulcerations of the trachea are considered to be of rare occurrence. In the majority of textbooks on surgery and diseases of the throat, no mention is made of these lesions, and Morell Mackenzie states that the affection is rare, and that he has seen "only three cases amongst 1,145 patients suffering from syphilis of the pharynx, larynx, and trachea." Later experience shows that syphilitic ulceration cannot be so uncommon, judging from the not infrequent cases which only come under notice when cicatricial contraction and stenosis attract attention.

Syphilitic stenosis of the main bronchi, without a similar condition in the trachea, is extremely rare.†

Diagnosis is sometimes assisted by the detection of syphilitic disease, or its scars, in the nose, pharynx, or larynx, but in many cases these aids are not forthcoming, and then the cause of the stenosis is arrived at by inspection, or by direct tracheoscopy (p. 46), after the other causes of extrinsic or intrinsic tracheal stenosis have been excluded (*see* p. 544). Serious syphilitic stenosis of the trachea has been met with in a young girl of 17.‡

The **prognosis** will depend on the degree and the depth of the stenosis. In cases where the contraction is low down, or cannot be relieved, or extends into the bronchi, the outlook is very grave.

Treatment must be prompt. Strict rest in bed should be secured, and the patient at once submitted to energetic mercurial treatment by inunction, if the symptoms are not very urgent, or by intravenous injection of salvarsan ("608"), or intramuscular injections of grey oil or calomel (*see* Chap. XLIX.). Inhalation of the fumes of sublimed calomel will be indicated if there is also ulceration in the trachea. A tracheotomy may be required, and should be performed as low as possible. If this fails to give relief, a Kœnig's long tube may succeed in getting below the narrowing.

TUMOURS OF THE TRACHEA

Primary growths of the trachea are exceedingly rare. In sixteen years' experience, Morell Mackenzie saw but 4 cases.

* Percy Kidd, *Proc. Laryngol. Soc., London*, iii., 1895, p. 18; *Clin. Journ.*, Dec. 30, 1896.

† H. D. Rolleston and Cyril Ogle, *Clin. Soc. Trans.*, xxxii., April 14, 1899. Samuel Wilks, *Guy's Hosp. Repts.*, ix., 1863, p. 37.

‡ Walker Downie, *Brit. Med. Journ.*, Oct. 14, 1899.

growths there may be blood-stained sputum, pain, dysphagia, and cachexia. Secondary symptoms are due to bronchitis, bronchiectasis, and atelectasis.

Death may occur (*a*) by suffocation, sudden or gradual, (*b*) by pneumonia, or (*c*) by hæmorrhage from erosion of large arteries of the neck.

Diagnosis is made by direct inspection. It may be arrived at by exclusion of diseases of the thyroid and œsophagus. Aneurysm must be carefully sought for, not omitting the use of radiography.

The **prognosis**, if the case cannot be operated on, is unfavourable. It is very grave in cases of carcinoma. Sarcoma has been known to extend over a period of years.

Treatment is either palliative or operative. A low tracheotomy will give relief in the majority of cases, as statistics show that over one-half of all cases of tracheal neoplasms are situated in the upper third of the windpipe. If the growth is lower down, an attempt must be made to pass a Kœnig's long cannula past it. In an emergency a piece of a rubber stomach-tube might be used.

Innocent growths can be removed by direct laryngoscopy (p. 44), or by a tracheotomy (p. 722), with, in addition, division of the cricoid, or even of the lower part of the thyroid (p. 732). The direct route is not suited for malignant growths. If operable they should be exposed by splitting the anterior wall of the trachea for a considerable distance.

Intratracheal injections are recommended by several observers in various chronic affections of the windpipe—tracheitis, syphilis, tubercle,—and in asthma. Their most useful indication

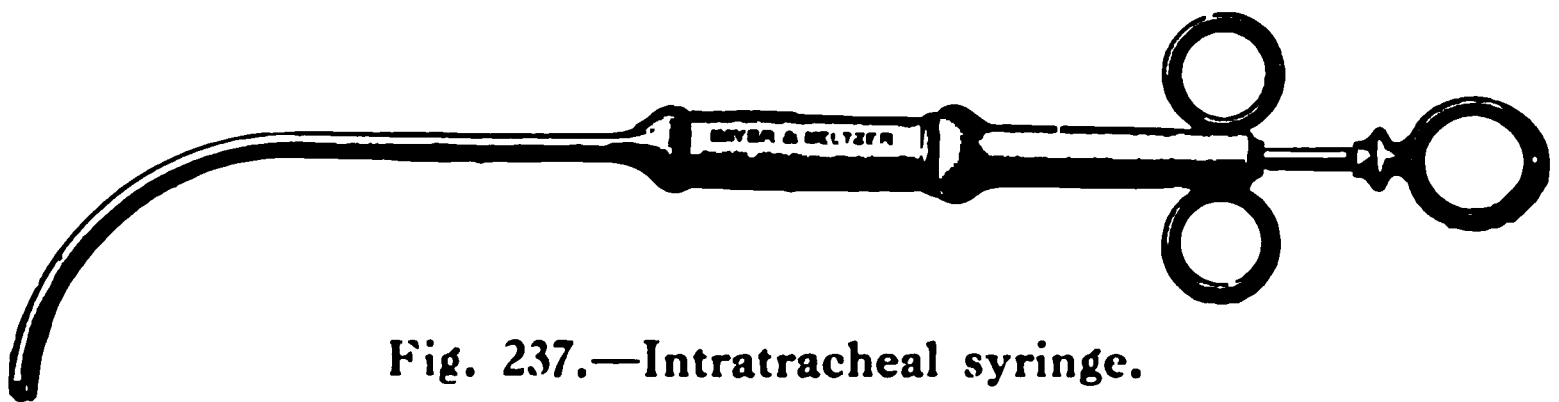


Fig. 237.—Intratracheal syringe.

is fetid bronchiectasis. The basis of the injection should be pure olive oil, or some such hydrocarbon oil as that sold under the name of benzoïnol. A drachm of this is used, although some recommend as much as an ounce. With this basis the following drugs may be incorporated, according to the nature of the case, namely, guaiacol 2 per cent., and menthol 10 per cent. (Grainger

CHAPTER XLII

DISEASES OF THE ŒSOPHAGUS

THE diseases of the œsophagus are described, more or less briefly, in textbooks on general medicine and surgery, but patients with difficulty of swallowing frequently apply to a throat clinic, and lesions of the gullet often cause symptoms in the pharynx and larynx. Besides, since the introduction of œsophagoscopy, great progress has been made in the study and treatment of the diseases of this viscus, and, as this is chiefly due to laryngologists, no excuse need be made for going into the subject somewhat fully.*

Surgical anatomy. Length.—The œsophagus begins behind the cricoid cartilage, on a level with the 6th cervical vertebra, and terminates in the stomach, opposite the 10th or 11th dorsal vertebra. The distance from the incisor teeth to the commencement of the œsophagus is 5-6 inches (15½-17 cm.). The length of the œsophagus itself is 9-10 inches, made up of the following areas :—

1. Cervical portion, from the cricoid cartilage to the manubrium sterni, 1½-2 inches (4-6 cm.).

2. Thoracic portion, from the top of the sternum to the opening in the diaphragm, 7 inches (16-18 cm.).

3. Abdominal portion, 1 inch (2-3 cm.).

The distance, therefore, from the incisor teeth to the cardiac end of the stomach is 14-15 inches (15½-17 inches according to Charters Symonds).

Shape.—The œsophagus is not a collapsed tube, as generally taught, but an elongated fusiform cavity. The œsophagoscope shows us that the first 4 cm. and the terminal 2 cm. are the only parts where the walls are in constant apposition, being closed by the sphincter muscles.† (Fig. 242, p. 560.)

Direction.—The upper extremity is opposite the centre of the vertebral column. In the greater part of its course the tube lies a little to the left of the middle line. Opposite the 4th dorsal vertebra (at the back of the arch of the aorta) it curves up to the mid-line of the spinal column, but then goes to the left again, to pass through the diaphragm on the left side of the 11th dorsal vertebra.

Relations.—In the neck the important relations are the trachea in front and the carotid sheath on each side. The right recurrent laryngeal nerve lies along the side of the œsophagus. The left recurrent

* J. Guisez, "Traité des Maladies de l'Œsophage." Paris, 1911.

G. Killian, *Ann. des. Mal. de l'Orille*, Juillet, 1908.

useful. The œsophagus is narrowed at its commencement, also opposite the bifurcation of the trachea, and again at its termination, where it is about $\frac{1}{8}$ inch in diameter, so that no bougie should exceed $\frac{1}{2}$ inch in thickness.

Auscultation has fallen into disuse, and is now largely supplanted by the œsophagoscope.

Dysphagia.—The symptoms of disease of the œsophagus will vary to some degree with different affections, but the one which is nearly common to all is dysphagia. As there are many conditions which may give rise to difficulty of swallowing, it may be well to tabulate the possible causes:—

In the nose, mouth, or pharynx.—Carious teeth, pyorrhœa alveolaris; inflammation, tumours, syphilis, or other infections of the tonsils, tongue, pharynx, palate, or postnasal space; retro-pharyngeal abscess, cervical caries; post-diphtheritic and glosso-labio-laryngeal paralysis.

In the larynx.—Any acute laryngeal affection—septic laryngitis, œdema, perichondritis; tubercle, syphilis, or malignant disease.

In the neck, outside the œsophagus.—Enlarged glands, thyroid tumours, particularly if malignant; aneurysm of the internal carotid or innominate artery; dislocation of the sternal end of the clavicle.

In the chest, outside the œsophagus.—Aneurysm, intra-thoracic tumours and abscesses (tuberculous, cancerous, etc.).

Affections of the œsophagus.—Congenital defect, functional dysphagia, spasmodic stricture, cicatricial stenosis from caustics, pressure pouches, malignant disease, varicose veins, syphilis, tubercle, foreign bodies.

It is rare for external pressure on the œsophagus, such as that of an aneurysm or a mediastinal growth, to give rise to well-marked obstruction.*

FUNCTIONAL DYSPHAGIA

Functional dysphagia may be manifested under two forms, a paralytic and a spasmodic. There is either a difficulty in moving the bolus of food from the mouth into the pharynx (the first stage of deglutition), or else the morsel cannot be passed from the pharynx into the gullet (the second stage), and is, as a rule, rejected. Once the food passes the level of the cricoid cartilage its descent to the stomach (the third stage) is not arrested.

* Osler, "Text-Book of Medicine."

Goodhart, *Lancet*, Nov. 8, 1902, p. 1241.

Charters Symonds, *Proc. Laryngol. Soc., London*, ix., 1902, p. 137.

in your early hysterical cases. It is most enduring and difficult of relief."*

Treatment.—The mental effect of the passage of the bougie acts admirably, but it is important to keep up the influence by suggestion. The patient must have it impressed on her that a full-sized bougie must be passed every week, if there is the slightest return of dysphagia. The mouth and teeth may require attention; many patients are remarkably anæmic, and need prolonged treatment; and the affection is much more common in the sedentary and those who dread fresh air. Ovarian and uterine irritation, as well as gout and rheumatism, may call for treatment. The usual remedies for hysteria may be required, including change, rest, spa treatment, massage, and electricity.†

SPASMODIC STRICTURE

Spasmodic contraction of the superior sphincter of the œsophagus occurs in functional dysphagia (p. 556). But spasm of the gullet may be symptomatic, reflex, or idiopathic.

Etiology.—In children, intestinal irritation (worms) is perhaps the commonest cause of reflex spasm. In adults, any of the neuroses may cause it; poison like rabies, and certain drugs which cause a dryness of the throat, like belladonna, may excite spasm; new growths and aneurysms may stimulate it by reflex irritation, apart from direct pressure. In old people, spasm may be set up by arterio-sclerosis, especially when the aorta is much affected.

The chief **symptom** is dysphagia; if the gastric sphincter of the gullet is affected, regurgitation will also occur. **Diagnosis** is founded on the indications suggested for recognizing functional dysphagia and malignant disease of the œsophagus. It is not always easy. **Prognosis** varies with the cause and nature of the underlying malady. In the idiopathic and reflex varieties the spasm may last a considerable time.

Treatment.—Any source of reflex irritation is first attended to. Antispasmodics—bromides, valerianates, and camphor—may prove useful. The passage of a full-sized bougie is generally beneficial. Electricity, faradic or galvanic, is sometimes ordered, with the positive pole in the œsophagus. The alarm and possible risk caused by such an application are not in its favour, particularly as the results are not better than those to be obtained by persistent general treatment and the influence of suggestion.

* *Loc. cit.*

† StClair Thomson, *Lancet*, Dec. 3, 1898.

RUPTURE OF THE HEALTHY ŒSOPHAGUS

This accident is not quite so rare as is commonly considered. About 25 cases have been recorded.* Rupture of the œsophagus may result from external traumatism, or from violent vomiting, generally after a full meal. It is predisposed to by any local ulcer, or weakness of the walls of the tube consequent on severe constitutional disease. It is more common in men in the prime of life, and in the alcoholic.

The **symptoms** are sudden and intense local pain, very hurried and laboured respiration, cyanosis, quick pulse, thirst, and collapse. Vomiting occurs in the majority of cases, but ceases when it has done its mischief. Agonizing pain follows any attempt at swallowing the stimulant which so frequently appears called for in these cases. The signs of pneumo-hydrothorax generally develop, nearly always on the left side. Emphysema may occur, appearing first at the root of the neck. Cough is not constant, but when present is very painful. Deglutition is not particularly disturbed.

A correct **diagnosis** is seldom made during life, and cases are apt to be mistaken for perforation of a gastric or duodenal ulcer, rupture of an aneurysm, angina pectoris, colic, or irritant poisoning.

Prognosis.—Death generally occurs within twenty-four hours. If the condition is suspected, anxiety will not be relieved until forty-eight hours have passed.

The rent in the œsophagus is generally in the lower third of the tube, in its long axis, and on the posterior wall. It usually opens into the left pleural cavity.

Treatment is symptomatic: relief of pain; discontinuance of all nourishment by the mouth; rectal injections. Surgical treatment, by posterior thoracotomy, does not hold out much promise of cure, particularly as the rent generally occurs in the lower third of the tube, and the difficulties and dangers of exploring the œsophagus below the 9th dorsal vertebra are well known.

* G. R. Turner, *Lancet*, Aug. 4, 1900, p. 350.

REFERENCES

- R. L. Bowles and George R. Turner, *Med.-Chir. Trans.*, lxxxiii., 1900, p. 241. (Gives references to 15 cases.)
 E. J. McWeeney, *Lancet*, July 21, 1900, p. 158. (Gives summary of 16 other carefully observed cases.)
 Howard E. Lomax, *N.Y. Med. Record*, lxix., Jan. 6, 1906, p. 1. (Gives several references.)
 P. L. Gunckel, *Amer. Med.*, x., 1905, No. 18, p. 726.
 T. H. Potter, *ibid.*, Sept., 1906, p. 340.

Symptoms.—The commonest symptom is gradually increasing dysphagia—always of ominous importance in an elderly subject. In no inconsiderable number of cases the onset is sudden. There may be pain—particularly when the central portion of the gullet is affected—and distaste for food. Attempts at swallowing are made with anxiety, but with evident goodwill, and often result in coughing and regurgitation of food or drink. Loss of weight is generally steadily progressive, and more rapid than the amount of nourishment ingested would lead one to suspect. But œsophageal obstruction may be a late symptom, or even be entirely absent throughout the course of the disease. In such cases the symptoms may be (1) dyspepsia, epigastric pain, vomiting and flatulence; (2) shortness of breath, cough, and expectoration; (3) loss of voice, stridor, and cough produced by the passage of food; (4) hæmoptysis; (5) aphonia, or only a tender lump in the neck.*

The disease usually progresses by inanition and cachexia, but complications arise if the cancer invades neighbouring organs. Thus "cough immediately after swallowing" may signify a communication between the œsophagus and the trachea, or a bronchus (generally the left), or the lung itself, and be the precursor of septic bronchitis or broncho-pneumonia. The bringing up of blood may be an initial symptom, and, in a later stage, hæmorrhage may be the cause of death.

Examination.—A laryngoscopic examination will sometimes show that a laryngeal paralysis (unilateral or bilateral abductor palsy) is an early symptom, caused by the growth pressing on the recurrent laryngeal nerve, or by actual destruction of the posterior crico-thyroid muscle (see p. 518, and Figs. 232, 233, p. 521). The left cord is, perhaps, more frequently and more completely paralysed, but both cords may be affected. Œdema of the arytenoids and neighbouring parts of the pharynx may be caused by a growth in the upper part of the gullet.

Occasionally a large, hard mass of glands in the neck will precede any definite symptoms of stricture, particularly when the upper part of the œsophagus is affected. These glands may be so large as to produce immobility of the larynx on the same side, and, by involving the cervical sympathetic, cause narrowing of the palpebral fissure, contraction of the pupil, and absence of sweating on the corresponding side of the head and face.†

Œsophagoscopy, when it is practicable, enables a diagnosis to be made promptly. It is the method of choice, and it not only

* G. H. Emanuel. "Cancer of the Œsophagus without Obstruction," *Lancet*, Oct. 18, 1902.

† H. T. Butlin, *Proc. Laryngol. Soc., London*, ii., 1895, p. 79.

H. T. Butlin, *St. Bartholomew's Hosp. Repts.*, xxix., 1893, p. 103.

obstruction in the upper third of the gullet is said to be always malignant (Symonds).

Prognosis.—This is always serious. When symptoms are declared, the average duration of life is from a few months to a year or a year and a half, death resulting from exhaustion, septic absorption, inanition, or pulmonary or other complications.

Treatment.—Treatment can only be alleviative. Food should be bland and non-irritating; but the patient is soon reduced to liquids, which should be as varied and nourishing as possible. Mixtures of bismuth and hydrocyanic acid sometimes soothe the local irritation and spasm. Rectal feeding is useful in emergencies, but is necessarily only a temporary measure.

The daily passage of a sound is attended with very small risk of perforation, and gives as good a prospect of life as gastrostomy.* The method of fitting a funnel in the stricture is thus described by Charters Symonds:†—"First ascertain by a large bougie the exact position of the stricture, i.e. the number of inches from the teeth; then pass the largest conical bougie possible, and judge by this the size of the tube to be used. Fitting now the introducer (made of whalebone and enclosed by a gum-elastic sheath), mark on it the distance of the stricture, or make a knot in the silk (the cords which are attached to the upper dilated part of the tube), and insert with the head thrown back. When it has entered the stricture, send the tube down slowly till arrested by the funnel, and withdraw the introducer. The silk is now tied round the ear and fixed behind by a piece of strapping." A better plan is that of W. Hill, who fits a malleable silver stilette inside a soft rubber catheter. This gives sufficient rigidity to the instrument to guide it through a stricture—under the control of the œsophagoscope. The upper end is fixed to a lower molar tooth.

Gastrostomy is frequently required, and should be done before a patient becomes too wasted and cachectic, particularly when the lower end of the œsophagus is affected.

Relief, if not cure, may be hoped for from applications of radium.‡

A tracheotomy may be required if respiration is interfered with, and other complications must be treated as they arise.

Foreign bodies in the œsophagus are described in Chap. LIII., p. 605.

Tubercle of the œsophagus.—See Chap. XLIV., p. 609.

* F. Schütz, *loc. cit.*

† Charters Symonds, *Lancet*, XLIII., 1884. *Brit. Med. J. Jour.*, April, 1887. *Lancet*, March and April, 1889.

‡ W. Hill, *Proc. Roy. Soc. Med., Laryngol. Section*, iv., Nov., 1900.

at in regard to the palatine tonsils.* The lingual tonsils are least frequently infected.† In none of these instances were there clinical evidences of tuberculosis. In patients dying of phthisis the palatine tonsil may be found tuberculous in 20 out of 34 cases.‡

These observations confirm the importance, already pointed out, of the defensive mechanisms in the nose and throat. They also support the view that in local resistance, as well as in general immunity, is to be sought the explanation of the incidence of disease.§ The suggestion that lupus is caused by inhaling an attenuated form of the tubercle bacillus is not feasible. It is unthinkable that the nose could escape the inhalation of virulent bacilli, and the fact that lupus of the air-passages is frequently followed by tuberculosis in the lungs or elsewhere proves that the bacillus has only to change its habitat to produce a severe clinical manifestation.

Pathology.—It is unnecessary to describe in detail the histological and bacteriological characters of tubercle in the nose and throat. They are identical with those met elsewhere, and are fully described in works on general medicine and surgery. The microscope reveals epithelioid cells, giant cells, and caseation. None of the three, however, belongs exclusively to tubercle. The presence of tubercle bacilli is undoubtedly characteristic. In free secretion, as in sputum, they can be found with ease. Unfortunately, bacilli occur scantily in tubercular deposits, and in lupus are only found with much difficulty. It is this scarcity of tubercle bacilli which minimizes the value of animal-inoculation tests.

Clinically, tuberculosis shows itself in the form of (1) infiltration, (2) ulceration, (3) tumour formation, (4) acute miliary infection, and (5) in healing areas by sclerosis. Infiltration may be absorbed, or become fibrosed, without coming to the surface. Tumours are but an exaggerated form of infiltration. Ulceration and sclerosis are the natural efforts at repair, and one, or other, or both methods are to be promoted or imitated. Secondary pyogenic infections may occur in tubercular ulcerations.

Lupus and tuberculosis.—It has been proposed by Massei to do away with the distinction between tuberculosis and lupus, as they are pathologically identical.|| All will agree with him that "lupus of the nose is a tuberculosis of slow progress, and often primary,"[¶] but the clinical manifestations are so different that the practical value of maintaining the present classification is obvious. At the same time, just as there are acute and chronic forms of tuberculosis, so a case of lupus may be more or less chronic, while cases are met with intermediate in degree between the two fairly marked types of tuberculosis and lupus. They might be called "lupoid" forms.

* A. Latham, *Lancet*, Dec. 11, 1900.

† P. Tilli, *Boll. delle Malattie dell' Orecchio*, xxv., 1907, No. 9, p. 189.

‡ Hugh Walsham, *Lancet*, June 18, 1898.

§ W. Watson Cheyne, *ibid.*, June 27, 1908.

|| *Proc. Laryngol. Soc., London*, vi., 1898, p. 1.

¶ *Rev. Heb. de Laryngol.*, xxv., 1905, No. 10, p. 273.

proper.* Early deposits in this region cause but trifling symptoms, and patients seldom apply for relief until the skin of the face is invaded. Early diagnosis of nasal lupus is, therefore, of great importance, not only to avoid infection of the skin of the face, but also to anticipate the pulmonary tuberculosis which is apt to ensue in certain instances.† The patient with lupus is apt to become phthisical, but the patient with pulmonary tuberculosis does not tend to develop lupus; if he develops mischief in the nose or throat it is, clinically, tuberculous.

LUPUS IN THE NOSE

The disease generally attacks the cartilaginous septum close behind the vestibule, as well as the adjoining floor of the nose and the anterior part of the inferior turbinal. It may spread to the middle turbinal, or to the skin of the vestibule. On the septum it is seen in the form of minute, discrete, apple-jelly-like nodules. As they appear on a pink background it is much more difficult for the untrained eye to detect them there than it is on the skin of the face. In the latter region there is also the help obtainable by pressing on them with a glass slide. As this renders only the adjoining skin bloodless and pale, the lupus nodules are made more evident by contrast. But a similar result can be obtained by applying a little adrenalin and cocaine to the mucous membrane of the septum. The healthy mucous membrane is then blanched while the nodules remain pinkish, and so stand out more clearly.‡ Sometimes the disease begins in the form of a sessile tumour, varying in size from a small pea to a hazel-nut. This appears§ at the usual point on the septum, slowly breaks down, and leads to perforation. This lupus tumour of the septum may resemble a small raspberry, and contain numerous tubercle bacilli.|| Perforation may also result from the confluence of lupus nodules. The hole made by lupus in the septum is irregular, surrounded with pale, indolent infiltration, secretes little, and increases slowly. It does not invade the bony septum. Nodules involving the inferior turbinal may persist for years without breaking down (Holger Mygind), or the deposits on the floor of the nose and the inferior turbinal may spread slowly, ulcerate and coalesce. The surface is coated with a sticky secretion which dries into adhering scabs. These, if retained,

* Holger Mygind, *Arch. f. Laryngol.*, Bd. xvii., Heft 3; *ibid.*, Bd. xiii., Heft 3; *ibid.*, Bd. x., Heft 1.

† StClair Thomson, *Proc. Laryngol. Soc., London*, iv., Feb., 1897, p. 34.

‡ StClair Thomson, *Journ. of Laryngol.*, xxii., 1907, No. 8.

§ F. J. Steward, *Guy's Hosp. Repts.*, liv., 1900, p. 149.

Chichele Nourse, *Proc. Roy. Soc. of Med., Laryngol. Section*, Feb., 1909, p. 94.

| Clement F. Thiesen, *Albany Med. Ann.*, xix., 1898, No. 3, p. 156.

of primary lupus in the nose or the vestibules, as the disease may not only be arrested but its extension to the face may be prevented. Inspection of the vestibules without the use of a speculum (Fig. 62, p. 109), and the suggested application of adrenalin to doubtful points on the septum, will be found helpful.

Prognosis.—If lupus is diagnosed before the infiltration is widespread and the nodules have ulcerated, the process can be arrested. When it is limited to the anterior part of the septum or inferior turbinal, further damage may be long delayed, although the patient must be prepared to keep up the toilette of the residual atrophic condition. But when the disease has extended into the deeper recesses of the nose, and the epithelial and secreting tissues are extensively destroyed, the prognosis must be more guarded. Relapses are not by any means due to morbid tissue being overlooked at the time of operation. Fresh deposits in healthy areas may take place at any time in a lupus patient. A cogent reason for frequent observation and active treatment is, as already pointed out, that the nasal cavity is the cradle of lupus of the face.

Treatment.—There is not the same tendency to spontaneous healing in the nose that there is in lupus of the larynx. Consequently, local treatment should be energetic and persistent. When the condition is met with before the apple-jelly infiltrations have broken down into an ulcerating, mammillated surface, excellent results can be obtained by the use of a fine galvano-cautery point (p. 62). This is introduced into the centre of each nodule, and the healthy tissue around should be carefully respected. When the nodules have broken down, the cautery can be used more extensively, and if applied around the margin of the diseased area it stimulates a limiting fibrosis. The cautery applications may require repeating every ten to twenty days, and should be followed by the introduction of a mercurial ointment (Formula 75), or tampons soaked in iodine (℞ Iodi pur. 1·0, pot. iod. 2·0, aquæ 2·0). In more extensive cases the tampons might be soaked in 1-1,000 sublimate lotion, or, if this proves irritating, in 1-700 solution of permanganate of potash. These tampons can be left in position for periods varying from 2 to 24 hours. Chromic acid can be employed if the cautery is not available (p. 64).

When a lupus-tumour of the septum is met with it should be freely excised. This, of course, necessitates a permanent perforation of the septum, but the perforation does not lead to any falling-in of the bridge of the nose, and a complete removal may prevent further mischief.

If the case only comes under notice when the nasal cavity is extensively invaded, a general anæsthetic is administered, a post-

has often to be spread over a considerable time. Recurrence is apt to take place, and the patient should report from time to time, so that fresh outbreaks may be promptly treated. For general treatment, *see* p. 584.

LUPUS IN THE NASO-PHARYNX

In this region the disease is rarely encountered. Holger Mygind only found five instances in 129 patients with nasal lupus. It may occur as an infection from the nose, and then is met with in the form of a lupus infiltration in the centre of the posterior wall. Or the disease may spread from the nose by direct continuity, or extend upwards from the pharynx to the posterior surface of the soft palate. From the naso-pharynx it may pass along the Eustachian tube to the ear.

Tuberculoma has rarely been met with, originating from the region of the choanæ, projecting into the postnasal space in the form of a non-ulcerating tumour, and as large as a small apple. Removal has not been followed by any recurrence of the lesion.*

Symptoms.—The destruction of the ciliated epithelium in this region leads to distressing dryness, with accumulation of adherent crusts. The process does not extend below the surface, but when arrested it leaves a permanent condition of atrophic postnasal catarrh.

Diagnosis.—The crusting need not give rise to any confusion with syphilis. The latter progresses more rapidly, is more acute in type, causes rapid destruction of tissue, and healing is followed by contracting scars. Other differences are indicated under Syphilis. In rhinoscleroma, which may occur primarily in the postnasal space, crusting is met with, but the cartilage-like infiltration is almost characteristic.

Treatment.—There is not the same proliferating infiltration which we meet with in lupus of the nose. Consequently the curette is seldom required. Early deposits should be treated with the galvano-cautery, the treatment of the nasal condition should be pursued diligently, and the resulting atrophic catarrh must be relieved (*see* Atrophic Postnasal Catarrh, p. 330).

LUPUS IN THE PHARYNX

Lupus in the pharynx may occur primarily ; it may be secondary to the laryngeal disease, but is more commonly a descending infection from the nose. Deposit takes place in the form of minute, discrete, pinhead points, generally pinkish with a yellowish apple-jelly-like centre. The local use of adrenalin will bring out these characteristics.

* Koschier, *Wien. klin. Woch.*, 1895, Nos. 36-42.

Symptoms.—Symptoms may be so completely absent that a patient will sometimes present the evidence of a spontaneously healed epiglottitis, and yet be unaware that anything was ever the matter with the larynx. There is often some anæsthesia, but not enough to cause trouble in swallowing. Cough is absent or slight. The use of the voice is not painful, but it becomes hoarse and harsh as the glottis is approached. This space may be so invaded that stridor is induced and tracheotomy becomes necessary. There is seldom dysphagia.

Diagnosis.—The appearances described, and its slow and painless progress, as well as its healing tendency, are generally sufficient to distinguish the affection. There are frequently confirmatory signs of lupus in the pharynx, nose, or skin of the face. If necessary, the confirmatory evidences described in the section on the nose may be sought for (p. 575). From leprosy the diagnosis is made by remembering that lupus occurs chiefly in females who have not been exposed to leprosy infection, and that the latter disease in the larynx would always be preceded by changes in the nose, pharynx, or skin. With syphilis there is little likelihood of confusion, except in the case of the inherited form. The distinction is best made by administering specific treatment; syphilis will improve under it, while lupus may be rendered more evident or even be aggravated.

As it is important to diagnose tuberculosis from lupus in the larynx, the following table has been adapted from Escat :—

DIAGNOSIS OF LUPUS AND TUBERCLE OF THE LARYNX

<i>Lupus</i>	<i>Tubercle</i>
Numerous discrete points.	Diffuse infiltration.
Respects the cartilages, with the exception of the epiglottis.	Rapidly infiltrates the deep tissues. Respects none of the cartilages, and is particularly apt to invade the crico-arytenoid joint.
Never causes œdema.	œdema, or œdema-like infiltration, not uncommon.
Serpiginous ulceration, with tendency to spontaneous healing.	Rarely shows any inclination to spontaneous healing.
Secretion slight, and tends to dry in sticky patches.	Surface always moist, and often puriform.
Indolent and painless.	Progressive and frequently painful.
Dysphagia exceptional, even when the epiglottis and arytenoid regions are affected.	Dysphagia is the rule as soon as the epiglottis and arytenoids are invaded.
Surface inclined to be anæsthetic as in leprosy.	Hyperæsthesia is nearly constant.

epiglottic articulation is never, and the vocal cords are rarely, invaded. Healing is promoted by the avoidance of the usual irritants of the larynx—dust, alcohol, and tobacco,—attention to the pharynx and nose, and the general care of the health.

Just as lupus of the larynx will heal under no treatment, so it appears to improve under various remedies. We must therefore be guarded in attributing special effect to any particular method, but the application of the galvano-cautery point under cocaine is certainly followed by marked and steady healing. It is equally suitable for all parts of the larynx, but care should be taken in making applications to the anterior commissure for fear of producing adhesions. For methods of application, *see* p. 607. If the whole epiglottis is infiltrated, or there are fungating masses on the ventricular bands or projecting from the interarytenoid space, they may be first nipped off with the cutting forceps.

Chromic acid fused on a probe (p. 64) may be employed instead of the cautery. I have found no benefit from lactic acid, though Lake's strong pigment may be useful (p. 606). A laryngeal spray of 1 per cent. formalin might be tried.

General treatment is important.

GENERAL TREATMENT OF LUPUS

This must be carried out in all cases, both to promote local healing and to prevent the development of tuberculosis in the lungs or elsewhere. Not that it is common to find the nose affected in pulmonary tuberculosis. Willigk only found the septum affected once in 450 instances.* The patients are frequently anæmic, and feeble in physique and vitality. Their general habits of health and hygiene require attention, particularly in reference to fresh air, diet, rest, and exercise. Cream, butter, eggs, and fattening foods should form a good part of the diet, and cod-liver oil, maltine, iron, strychnine, and arsenic are often indicated. Arsenic is so strongly recommended by Lack that he considers it beneficial in all lupous affections of the upper air-passages, and even a specific when the pharynx is involved.† I have not been able to confirm this. Tuberculin injections have been employed, and when controlled with the opsonic index good results have been obtained.‡ In my own experience the treatment is sometimes disappointing, and many patients have felt that their symptoms were aggravated.

* *Präger Vierteljahrschr. f. prakt. Heilk.*, Bd. xxxviii., 1853.

† *Proc. Laryngol. Soc., London*, xii., Dec., 1904, p. 23.

‡ Hunter Tod, *Practitioner*, May, 1908, p. 703.

area covered with a dirty, greyish-white, membranous deposit. On being wiped away this leaves a raw, bleeding, mouse-nibbled surface on the velum, uvula, fauces, and possibly the posterior pharyngeal wall. It may extend to the cheeks and epiglottis. The soft palate is pale and paretic, and the uvula is red, glistening, and œdematous. The glands at the angles of the jaws are frequently involved. They may be mobile and not painful, or may break down into an abscess.

Symptoms.—The process is an acute one, and is always accompanied by marked aggravation of the general symptoms of tuberculosis. In addition there is acute pain radiating to the ear, dysphagia, increased salivation, anorexia, rapid wasting, and fever. The palatal insufficiency may allow of regurgitation of fluids through the nose. There is great difficulty and distress in clearing the throat of tenacious mucus. The voice is throaty and painful.

Examination.—The onset of the disease is insidious, so that a case seldom comes under observation until the tough, adherent, whitish, membrane has formed. At first sight this is very suggestive of diphtheria. The œdema of the uvula shows the acuteness of the process. There will generally be a history of tuberculosis, with evidence in the larynx, lungs, and sputum, though a few cases have been recorded in which the pharyngeal symptoms were far advanced before careful examination of the lungs could reveal any evidence of tuberculous deposit.*

Diagnosis.—If the appearances and history are not sufficient to distinguish the membrane from that of diphtheria, the absence of the Klebs-Löffler bacillus will determine it. Tubercle bacilli may be found in the exudation in the throat, as well as streptococci and diplococci. The condition is not likely to be confounded with syphilis.

Prognosis.—This is always serious. Death from rapid wasting and inanition may ensue in from three weeks to three months. I have known it to occur suddenly from heart-failure.

Treatment.—It is important to remember that these cases are hopeless, and that efforts to arrest the local disease by caustics and so forth only aggravate the misery of the patient's pitiable condition. The mouth and throat are kept as clean as possible with antiseptic lozenges (Formulae 43 and 46), as gargling or spraying is too painful and fatiguing. Pain is relieved by insufflations of orthoform, or sprays of cocaine, or a morphine tablet on the tongue. Hypodermic injections of morphia should not be spared, and the patient must be given any nourishment that he can swallow. (See Treatment of Laryngeal Tuberculosis, p. 604.)

* Walter F. Chappell, N.Y. *Med. Journ.*, Sept. 19, 1896.

TUBERCULOSIS OF THE LARYNX.

Fig. 1.—Tubercular infiltration of interarytenoid region, and of both arytenoids, particularly the left. Both vocal cords are infiltrated, and there is ulceration of the free margin of the left cord, in its posterior third.

Fig. 2.—Early tuberculous laryngitis. There is general anæmia of the larynx. In the interarytenoid region there is a mammillated infiltration, and its irregular surface is beginning to ulcerate. (*Sir* p. 592.)

Fig. 3.—Marked infiltration of the left; ventricular band, which almost hides the ulcerated vocal cord on that side. Ulcerated infiltration of the interarytenoid region. Nodular infiltration of right cord.

Fig. 4.—Pseudo-œdema of epiglottis and both arytenoids, preventing any view of the interior of the larynx.

Fig. 5.—Case of rapidly progressive tuberculosis of larynx. Infiltration of both ventricular bands; ulceration and destruction of both vocal cords; subglottic infiltration on right side; infiltration of both arytenoids, and œdema over the right, indicating acute perichondritis of the right crico-arytenoid joint.

Fig. 6.—Miliary tubercles on epiglottis. Marked infiltration and acute œdema of epiglottis and both arytenoids. This patient developed tuberculosis while under observation for nasal sinus disease, and died in three months.

because our present methods of investigation are inadequate to detect early or limited deposits in the chest.

Paths of invasion.—Infection of the larynx from the lungs may take place (*a*) from the surface of the mucous membrane by the sputum, or (*b*) from the submucous area where the tubercle bacilli arrive from the lungs by the blood- and lymph-streams.

The former is the older theory, advanced by Louis,* and founded on the observation that the posterior half of the larynx, where sputum is apt to collect and linger, is the part most frequently attacked. The objection made to this theory, viz. that tuberculosis is rare in the trachea and bronchi, where sputum accumulates for even longer periods, is met by the explanation that the surface of the larynx is more apt to be irritated, and perhaps abraded, by catarrh, over-use of the voice, and coughing, so making it a *locus minoris resistentiæ*.

The theory that infection is carried from the lungs to the larynx by the vascular and lymphatic channels, principally supported by Heinze, is founded on the observation that deposits are met with below intact epithelium, and, therefore, could not have been infected from the surface.† But it is now recognized that tubercle bacilli can pass through or between healthy epithelium and leave it intact.‡ Another argument adduced to support this view is that the larynx is first, or principally, attacked on the same side as the affected, or most affected, lung.§ In cases with well-marked affection of one lung, the larynx has been found invaded on the same side in 84·6 per cent.|| But this view, though commonly, is not unanimously accepted.¶

The chief argument in favour of infection by the vessels is that infiltration and ulceration may be extensive in the larynx when there is little or no sputum passing over it; that tuberculosis may develop in the larynx in cases where the sputum has ceased to contain bacilli; and, on the other hand, that the larynx may remain healthy in long-standing cases of phthisis, although constantly bathed in sputum laden with bacilli.

The tubercle bacilli arriving by the blood- or lymph-stream excite small perivascular follicles, and then, by union, a more diffused infiltration. These follicles undergo necrosis at their centres, owing to obliteration of vessels, and tend to ulceration, which spreads deeply according to the amount of infiltration. This does not negative the possibility of infection from erosion or superficial ulceration of the epithelial surface. The process, in the latter case, does not tend to spread deeply, and may heal readily and even spontaneously, and tubercular foci cannot be found on their margins. This possibility

* "Recherches sur la Phthisie." Paris, 1825.

† Heinze, *op. cit.*

‡ E. Fraenkel, *Virchow's Arch.*, Bd. cxx., 1890, and *Deut. med. Woch.*, 1891, No. 19.

J. Wright, *N.Y. Med. Journ.*, Sept. 26, 1896.

§ Türck, Schech, Schrötter, Friedreich, Schnitzler, Schaeffer, R. Pfeiffer, and Robert Krieg, *Arch. f. Laryngol.*, viii. 1898, S. 510.

|| Hanna Maimin, *Zeitschr. f. Laryngol.*, i., 1908, Heft 2, S. 267.

¶ Jurasz, M. Schmidt, Magenau, Frese, Blumenfeld, Besold and Gidionsen, and L. Laub, *Arch. f. Laryngol.*, Bd. xxi., 1909, S. 58.

condition of the laryngeal mucosa, frequently secondary to infective or obstructive nasal disease, would appear to be a predisposing cause.

Occupation.—Sedentary and dusty occupations conduce to pulmonary tuberculosis, but there are no figures to show that they conduce to the larynx being particularly affected. I have met with the disease in singers, although voice-use is generally regarded as a protection against tubercular infection.

Syphilis is not uncommonly met with preceding or associated with tuberculosis.

Alcohol, dust, and tobacco are well-known etiological factors in all laryngeal affections.

Symptoms.—There may be an entire absence of subjective symptoms in early or slight cases, and hence the importance of a laryngoscopic examination in every suspected case of pulmonary tuberculosis, and a periodical inspection in all chronic cases. Of 114 patients, Laub found that 64.9 per cent. had no complaint of the larynx, 32.5 per cent. had hoarseness and cough, and only 2.6 per cent. had pain in the larynx and odynphagia.

Cough is not an important early symptom. It is generally bronchial or pulmonary in origin. In many cases it is completely absent, even in long-standing and extensive disease. In others there is a cough which is phlegmy and incomplete, and may be accompanied by vomiting. Occasionally the cough may resemble whooping-cough, and then may be due to glandular enlargement and pressure on the recurrent laryngeal nerve. Any sputum comes principally from the lungs. It may remain absent for years, if the lungs are not breaking down. The secretion from laryngeal ulcers is mucoid or muco-purulent. Very rarely it is faintly streaked with blood. It is seldom that tubercle bacilli can be found in it. In later stages it may contain bits of necrosed cartilage.

Paræsthesia or subjective sensations in the larynx are common. A feeling of uneasiness, fullness, or irritation may excite hemming and clearing in the throat. Change in the voice, at first absent or slight, is generally progressive, but will depend on the situation and stage of the lesion. Generally the voice tires easily, lowers in pitch, and becomes weak and bitonal. It may sound weak, dull, rough, woolly, or hollow and toneless, but is seldom rasping and rauous. Later on the voice is thick, phlegmy, and at times aphonic. It may become reduced to a hollow whisper. Dyspnœa is seldom an early symptom, and its gradual onset is generally due to progress of the pulmonary disease. It may become marked and accompanied with stridor if fixation of the cords takes place, or if the glottic or subglottic spaces are invaded by large infiltrations or granulations. Pain and tenderness over the larynx are seldom complained of, except in cases of perichondritis. Odynphagia may

generally uniform, most marked at the arytenoid end, and tends to invade the ventricular band. The pharyngeal surface is also affected, so that the sinus pyriformis is encroached on. Ulceration is most commonly seen on the inner surface and at the arytenoid end of the fold.

Vocal cords.—Owing to the close adhesion of the epithelium to underlying elastic and muscular tissue, and the scarcity of sub-mucous and connective tissue, simple infiltration is rarely met with, and white, polished, intact vocal cords may be found in cases showing undoubted deposit in the ventricular bands and arytenoid region. Still it does take place, generally in the posterior or middle segment of the cord. A red, granular state of the cords, as if dusted with red pepper (*chorditis granulosa* of Lake), may be met with (Plate xvii., Fig. 1). The cord may assume a succulent look and soda-water-bottle shape, while it loses its polish and becomes dull greyish, or dusky pink. A fringe of granulations may lie along the attached border, apparently projecting from the ventricle of Morgagni (Plate xvii., Fig. 1). Irregular leashes of vessels appear, and the flat, ribbon-like surface becomes rounded and the free edge sinuous. There is often a want of tension in the cord during phonation, and the sound emitted may be cracked and uneven (Plate xiii., Fig. 5).

Ulcers on the cords are difficult to recognize, as their edges gradually fade into the surrounding healthy tissue, which is not so very different in colour. They are superficial, irregular, and ill-defined (Plate xvii., Fig. 1). When more advanced they are readily recognized by their irregular, dirty-grey surface and more distinct edges (Plate xvii., Figs. 1, 3, and 5). Single erosions are frequent over the vocal process, and ulcers on the cords are more common over the posterior half; they are generally multiple, tend to become confluent, are often limited to one cord at first, but are frequently bilateral. A series of erosions along the free margin gives a serrated, mouse-eaten appearance to the cord. Sometimes one long ulcer will give it a bifid look.

Vegetations spring up from the ulcers, so that the original form of the vocal cords is quite lost, and the glottic space is much encroached on. When these vegetations become coated with thick, adherent sputum, respiration may become alarmingly embarrassed. But this ceases as the granulations break down, and then the deceptive symptoms of improvement are really due to more or less complete destruction of the vocal cords.

The ventricular bands.—According to some observers, infiltration of the false cords is very common, and one of the earliest

which is not a favourite site clinically.* The small papillary thickenings in the neighbourhood of the cords and interarytenoid space are made up of thickenings of the epithelial layer, or of hard, fibrous, and poorly vascularized tissue. These hypertrophies may not show tubercles (Kundrat), nor tubercle bacilli (Grünwald), nor positive inoculation results, and yet may undoubtedly be caused by tuberculosis. As pointed out, the so-called "œdema" is often found post-mortem to be not œdema, but a soft or even sclerotic infiltration.

Diagnosis.—The diagnosis of laryngeal tuberculosis is not only important on account of the local condition, but also because the laryngoscope can sometimes settle the diagnosis of some uncertain pulmonary infection, and will always prove valuable in forming a prognosis in tuberculosis of the lungs. In a large proportion of cases the appearances described are sufficient to enable a diagnosis to be made from inspection only. Sometimes early symptoms can only be regarded as suspicious until the laryngeal evidence is supported by proof of tuberculosis elsewhere. In other instances the supporting evidence can only be gained by the progress of the case—the gradual increase of laryngeal changes, with the slow evolution of early general symptoms (p. 590). The conclusive evidences of tubercle bacilli should not be waited for; they are not present in all cases. When seeking confirmatory evidence in the lungs it is well to remember that the presence of laryngeal disease may alter the physical signs in the chest, generally in the direction of minimizing them.

The injection of tuberculin has been suggested as a diagnostic test, but the fear of lighting up quiescent or retrograding foci has generally impelled laryngologists to rely on other data. Diagnosis by the ophthalmic reaction, or by opsonic estimates, is not yet sufficiently established to be reliable.† The skin reaction (von Pirquet) is free from risks, but it is not yet settled that its presence is a proof of active tuberculous disease.‡ The reaction of tuberculin on the nasal mucous membrane promises to be convenient.§

The tuberculin reaction on the skin (von Pirquet's method).—This diagnostic method is carried out as follows: With the sharp point of a straight surgical needle the epidermis is chafed off, exposing a small circular patch of the pink cutis vera. Bleeding or oozing is to be avoided. On this vascular surface a

* Henze, *loc. cit.*

† W. MacLennan and J. S. Webster, *Brit. Med. Journ.*, Dec. 7, 1907, pp. 1642 and 1644.

"The Opsonic Method and Vaccine-Therapy," *Practitioner*, lxxx., May, 1908, p. 565.

‡ Charles McNeil, *Brit. Med. Journ.*, Nov. 6, 1909, p. 1335.

§ Laite-Dupont and Moulinier, *Ann. des. Mal. de l'Oreille*, xxxv., 1909, No. 5, p. 560.

occurs. Obstruction is generally so gradual that the onset of stridor, as well as laryngoscopic examination, gives sufficient warning of the necessity of tracheotomy. Sudden death from glottic spasm has been recorded, but is rare.* Acute œdema is also a rare but possible occurrence.†

It is often said that consumptives never die from the larynx; and it is noteworthy that, however distressing the laryngeal symptoms may be, death is generally caused by the pulmonary condition. But the saying is not absolutely true. Tuberculous laryngitis may, though rarely, cause sudden asphyxia, and indirectly it precipitates a fatal termination by dysphagia and starvation, and by the mental depression and anxiety it is so apt to cause.

Treatment.—Treatment may be directed (1) to obtaining complete arrest of the tubercular infection, pulmonary and laryngeal, (2) to curing it in the larynx, and (3) to relieving symptoms.

The case must always be viewed as one of pulmonary origin, with laryngeal extension and general symptoms. The general care and hygiene of the patient is therefore of primary importance. It is best carried out in an open-air sanatorium. When this is impossible, the principles of diet, rest, exercise, constant exposure to unvitiated air, and regular medical supervision should be adhered to. Tobacco and alcohol must be abandoned, and sudden exertion, as well as games and violent exercises, should be given up. When an abundant and fat-forming diet, with a regular open-air existence is not possible, such foods as cod-liver oil and maltine must be given, while arsenic or some creosote preparation may be prescribed, and wide-open windows are insisted upon, at least at night. Under this general treatment and the relief of symptoms, many cases of early laryngeal disease will heal spontaneously. This will be further promoted by rest to the larynx, best secured by complete silence.‡ Rest is particularly valuable in the early stage, on the first efflorescence of laryngeal lesions. Under its influence an abraded ulceration of one cord may heal up in two months.§ Sometimes six months of strict silence are required. If the local symptoms have not then subsided, it is generally unnecessary to persevere with absolute silence, and some local measures are generally called for. Yet in all stages, even in hopeless cases, the larynx remains cleaner and more comfortable if talking is reduced to a minimum, and the patient is encouraged to suppress his cough as much as possible.

The larynx is relieved of catarrh by the use of cleansing alkaline

* Massier, *Arch. Internat. de Laryngol.*, xviii., 1904, No. 5.

† Logan Turner, *Edin. Med. Journ.*, May, 1902.

‡ StClair Thomson, *Trans. Internat. Congr. of Tuberc. of 1901, London*, vol. iii., p. 356.

§ StClair Thomson, *Proc. Roy. Soc. Med.*, iii., Nov., 1900, p. 6.

rest to the larynx. It is required in cases of increasing or established stenosis, but a threatening indication for it will often disappear when the fungating granulations which obstruct the glottis break down. Tracheotomy may be required in healed cases where the cicatricial contraction has produced stenosis (p. 536).

Thyrotomy (laryngo-fissure) has effected a cure in a few cases.* In the majority it has only hastened a fatal termination. The wound in the neck is very apt to get infected with tubercle. It is no better than tracheotomy in a hopeless case, and as a curative remedy it is seldom justifiable.

Indications for or against surgical treatment for laryngeal tuberculosis are thus epitomized by Heryng: † —

Surgical treatment is indicated—

- (a) In tubercular tumours of the larynx.
- (b) In chronic circumscribed infiltrations, particularly in thickenings on the posterior wall of the larynx which show little tendency to ulceration.
- (c) In chronic ulcerations situated on infiltrations and surrounded by granulations which resist every other method of treatment.
- (d) In a unilateral affection of the larynx involving the epiglottis, the ventricular band, and the ary-epiglottic fold.

It is contra-indicated—

- (a) In cases of advanced pulmonary tuberculosis complicated with fever and cachexia.
- (b) In diffuse miliary tuberculosis of the larynx, or of the larynx and pharynx.
- (c) Whenever there is cachexia.
- (d) In marked stenoses of the larynx caused by inflammatory swellings of the parts affected. In such cases prompt tracheotomy is necessary.
- (e) In patients who are timorous, nervous, irritable, suspicious, without energy and confidence, and in all those in whom the general condition gives little promise of cure.

The treatment by *tuberculin injections* is still a much-discussed subject, and readers are referred to current literature.‡

Treatment of complications.—The coincidence of syphilis in the larynx calls for stricter general treatment in the way of hygiene, diet, and rest. Inunctions of mercury are more effective than iodides.

Pregnancy must always be viewed with anxiety. It would generally contra-indicate active local treatment, but tracheotomy

* Otto J. Stein, *Laryngoscope*, Oct., 1904.

Lambert Lack, *Proc. Laryngol. Soc., London*, ix., April, 1902, p. 99.

Harold Barwell, *Proc. Roy. Soc. Med., Laryngol. Sect.*, iii., Nov., 1907, p. 7.

H. Tilley, *Brit. Med. Journ.*, 1907, ii.

† *Ann. des Mal. de l'Oreille*, xxxiv., 1908, No. 11, p. 497.

‡ W. Carnac Wilkinson, *Brit. Med. Journ.*, 1910, ii., Nov. 26, p. 1705.

H. Batty Shaw, *Practitioner*, Dec., 1910.

CHAPTER XLV

SYPHILIS OF THE UPPER AIR-PASSAGES

SYPHILIS of the nose and throat is particularly interesting and important for several reasons. Some of the manifestations of this widespread affection appear in the throat as part of the regular course of the disease ; the diagnosis in many cases is decidedly difficult ; the symptoms are at times obscure and insidious ; the lesions may progress with alarming rapidity ; treatment is generally successful, if suitably applied ; malignant types are sometimes met with ; the disease in these regions may be fraught with serious danger to life ; and the sequelæ may involve permanent disfigurement, or grave interference with voice, respiration, and deglutition. It therefore behoves all practitioners to be acquainted with the symptoms of syphilis in this region, since they may be of great importance in helping to diagnose lesions which may appear elsewhere ; and, on the other hand, the specialist, who is ready to recognize syphilitic manifestations in other parts, is better able to settle the doubtful diagnosis of appearances in the nose or throat.

Treatment has in many instances to be promptly and effectively carried out. The treatment of syphilis varies somewhat according to the region of the body in which it appears, and in the upper air-passages this differentiation is often well marked.

Syphilis is analogous to the exanthemata, in that there are eruptions on the skin and mucous membranes, which develop at a certain period after infection. But instead of their developing at the end of two weeks, the period of incubation is generally more nearly ten weeks ; and the course of syphilis is counted in years, instead of weeks ; its onslaught is less violent ; fever is only met with during the skin eruption, and there is difficulty in recognizing any specific catarrh. Like scarlatina and measles, it affects the throat.

The history of infection is deceptive, as it may be absent or be denied. When present, it may be misleading, for a syphilitic subject may very possibly have tuberculosis or malignant disease ; and a syphilitic ulcer may become carcinomatous.

The supporting evidence may be defective. Until lately we have had no characteristic proof, like the bacilli of tuberculosis or the microscopic appearances of malignant disease. It seems probable that the detection of the *Spirochæte pallida* and the serum reaction (Wassermann) will supply this want ; but the clinical training of the practitioner will still be the chief factor in the very important matter of diagnosis. The treatment of syphilis has recently been much improved, both by the introduction of new remedies and by the perfecting of older methods.

It is most likely to be mistaken for some form of malignant growth. In coming to a conclusion we have to be guided to a great extent by the progress of the case. With simple measures of cleanliness the chancre will improve; a malignant growth continues to increase. The age and history of the patient afford some suggestion;



Fig. 249. —Chancre of the vestibule of the nose. (*Castex*.*)

primary syphilis is most frequently contracted between the 20th and 40th years, while malignant disease is uncommon before this latter date. The glandular enlargement is earlier and more marked with a chancre than it would be with a malignant growth of the same size and duration. If the progress of the case does not settle the diagnosis, a portion of the growth may be removed and

* *Bull. de Laryngol.*, tome 1^{re} trimestre, 30 Mars, 1878, p. 33.

more so on one side than on the other. Mucous patches are very rare, but have been described on the anterior end of the septum and inferior turbinal. Suspicious fissures are more likely to be found on the floor of the vestibules. It would be unusual for the specific character of the affection to be suspected except from the discovery of other symptoms.

Treatment.—Once the diagnosis has been established, a suitable general treatment should be instituted (*see* Chap. XLIX., p. 654). Local treatment is not so important as in either the primary or the tertiary forms, as there is less interference with the functions of the nose. Strong nasal lotions might only aggravate the rhinitis; it is therefore sufficient to prescribe some simple alkaline nose lotion, and a weak mercurial ointment for the vestibules (*see* Formulæ 9 and 76).

TERTIARY SYPHILIS OF THE NOSE

Tertiary syphilis in the nose may be met with in the form of (1) gumma; (2) ulceration; (3) perichondritis and necrosis; and (4) syphilitic ozæna or atrophic rhinitis. The gumma is in all cases the foundation of the several manifestations.

The tertiary is the most common and the most serious form in which the syphilitic poison affects the interior of the nose. It is one of the most important affections we are called on to treat, not only because it causes great inconvenience and distress to the patient, but because it often renders him a pariah while it lasts, and may leave the stigmata of the disease in his physiognomy for life. Besides, by extension to the brain it may entail death. Post-mortem examination shows that lesions of the nose are found in 2·8 per cent. of syphilitic subjects.*

Etiology.—Tertiary symptoms may appear in the nose any time after the second year from the date of infection. They have been met with a few months after infection, and before the secondary symptoms have disappeared.† The time of onset, according to the statistics of Michelson and Tissier, is from one to three years from the date of infection. Still, it is rare to find tertiary syphilis before the fifth year of the disease. On the other hand, there is hardly any limit to the lateness of the date at which it may appear, an interval of twenty years being not at all exceptional.

Pathology.—The histological characters of a gumma need not be described, as it resembles that found in other regions. It is deposited in the submucous tissue, between the mucosa and the periosteum or perichondrium. The favourite site is the septum, and next in order come the inferior turbinals and the floor of the nose. It may also affect the nasal bones, or the alæ nasi. In early stages it causes so few

* Willigk, *Prager Vierteljahrschr.*, Bd. xxiii., 1856, No. 2.

† W. Scott Renner, *Trans. Amer. Laryngol. Assoc.*, 1903, p. 15.

them is painful and leaves on the skin a pit of œdema. This may be a diagnostic point of some importance.

Syphilis in the vestibule of the nose may completely destroy the columella, or eat its way through to the skin of the face, causing a perforation or entire destruction of the ala nasi. In other cases the infiltration and fungation may imitate a malignant growth.

Examination.—If an examination should be made in the early stage of a gumma, the nasal mucous membrane will be found of a much deeper tint than in ordinary catarrh; this is not generalized, but is more marked near any swelling. The use of cocaine may reveal a red, ill-defined tumour in one of the favourite situations, but most commonly on the septum. It will be firm to the probe, and does not retract under cocaine. Probably it would already be soft and fluctuating in its centre, but as a matter of fact it seldom comes under observation before it has softened and ulcerated. In that case the examiner may be struck with the smell from the nose. Inspection of the interior may be concealed by masses of secretion and crusts, so that the cavity must be first cleansed and cocainized before a complete examination is possible. This will reveal the syphilitic gummatous ulceration, whose appearance is fairly characteristic. It is irregular in extent and outline. The margins may be vertical or overhanging, and thickened and indurated, but they are frequently irregular, granulating, and bleed easily. The base of the ulcer is deep and flat, concealed by a coating of thick, tenacious, yellow pus, and at the bottom of it bare bone can often be felt. The latter should always be sought for with the nasal probe.

Gummatous infiltration.—A more diffuse infiltration of the gummatous process may occur with obscure symptoms. The patient then complains of bilateral nasal obstruction, generally constant, and often complete, so that the voice is “dead.” There is anosmia, but very little discharge. Pain in and around the root of the nose, worse at night, may be severe.

Examination shows the nose to be generally swollen and distended across the bridge, but there is no redness. Two fairly characteristic symptoms may be present: one is the marked tenderness elicited on pressing along the bridge of the nose (i.e. over the nasal bones or edge of the quadrilateral cartilage), and the other is that the obstruction rarely intermits, and is practically uninfluenced by the use of cocaine. The interior of the nose is darkly congested, and little of it is visible, as the swollen inferior turbinal is tightly packed against the inflamed septum. The discharge is watery or muco-purulent.

Concomitant symptoms may assist the diagnosis. This should

site in the bony septum is near the floor, anteriorly. This is often indicated by a small swelling, like a watch-glass, in the middle line of the hard palate, and close behind the gum. Any fluctuation here, with nasal symptoms, is strongly suggestive of tertiary necrosis, and if bare bone can be felt, or a probe passes through from the roof of the mouth to the nose, the diagnosis is certain.

The perforation may involve the cartilaginous as well as the bony septum, and practically the whole partition may be destroyed. When the process is located anteriorly, it may destroy the columella of the nose, and the subsequent retraction leads to an ugly deformity which is very difficult to correct. The probe must be carefully directed to the roof of the nose, on account of the risk of propagation of septic infection to the brain. The necrosed bone may be found loose in the nose, and is often irregular, hard, black, and very fetid. The ulcerated surface below it slowly heals, but the loss of substance is, of course, permanent. While small perforations through the soft palate or bony floor of the nose will often close, the larger ones are permanent, and this is particularly true with regard to destruction of the septum. The ciliated epithelium of the mucous membrane is replaced by the flat epithelium of cicatricial tissue. The inflammatory process is generally widely extended, and in untreated cases it is gradually converted into scar tissue, which slowly contracts and produces the disfigurement so often associated with this affection. The nose does not fall in because the support of the septum is removed; like all bridges, it is not supported at the centre of the arch, but from each buttress; the septum can be almost entirely removed in a surgical operation and yet the bridge of the nose does not collapse (Fig. 92, p. 163), nor, as a matter of fact, does it fall in immediately when the greater portion of the septum has necrosed away. The arch founders gradually—a result that is due, not to the removal of its supports, but to the powerful traction exerted by the shrinking of the scar tissue. If suitable treatment is instituted early these results can generally be avoided, even although there may be a large perforation in the septum.

When the nasal bones are attacked with syphilitic disease the upper part of the bridge caves in, and although the nostrils remain unaffected and the septal cartilage intact, a characteristic external disfigurement is produced (Fig. 257, p. 650). This is further accentuated if the septum is destroyed, and the lower part of the bridge also falls in.

Syphilitic necrosis may affect the walls of the nose, invading the superior maxilla, destroying the lachrymal canal, or leading to exfoliation of large pieces of the ethmoid or sphenoid. In this

in distinguishing some cases ; but the special characters of the latter, as well as the general coincidence of a skin lesion, serve to mark the distinction. There is no characteristic odour about lupus.

It is from malignant disease, especially when the bone has not been affected, that we sometimes find difficulty in making the distinction. For particulars the reader is referred to the section on Malignant Growths in the Nose (p. 202). In many cases the administration of antisyphilitic remedies must be tried.

The admission, or the denial, of a history of syphilis may only be misleading.

All perforations of the septum are not produced by syphilis. In fact those perforations occurring anteriorly, and limited to the cartilaginous septum, are, with hardly an exception, due to other causes, such as surgical measures (p. 155), traumatism (p. 142), lupus (p. 574), enteric (p. 671), and, possibly, rheumatism. The syphilitic process leading to a perforation in the septum attacks by preference the chondro-ethmoid suture, or the posterior part of the vomer. Consequently it may involve both cartilage and bone ; but it nearly always involves bone.

Prognosis.—The prognosis of tertiary syphilis anywhere in the nose and throat will depend on the site and extent of the lesions ; the age, habits, and circumstances of the patient ; the presence of any organic disease, especially renal ; a history of alcoholism ; and delayed or inefficient treatment.

Patients are sometimes depressed with fear as to the deformity which may ensue. If they do not realize this possibility they should be gently warned of it, while they can be assured that with care and prolonged treatment it can be almost certainly avoided.

General treatment.—There are few manifestations of syphilis which require more prompt and active treatment, or which yield more satisfactory results, than those occurring in the nose. If a case presents itself in an early stage, before or just after a gumma has broken down, the chance of disfigurement can by treatment be reduced to a minimum, while even in more advanced cases, if marked retraction has not taken place it can generally be avoided. The general treatment begins with the prompt administration of iodide of potassium, commencing with small doses, but, in inveterate cases, increasing them steadily up to even 30 or 60 grains three times a day. There are many cases in which this drug alone will have often magical effects when combined with suitable local remedies, but there are others in which it appears almost useless without the administration of mercury, and in all cases this latter drug is called for, not only for the relief of symptoms, but because if given through the skin it prevents the legacy of atrophic rhinitis

be raised from its bed by a variety of levering and to-and-fro movements. Several sittings may be required; but this is inevitable, as any violent measures are soon arrested by the hæmorrhage, which is often considerable. When the necrosed bone has become loose it may be too large for extraction through the nares; it has been known that a mass like the greater part of the body of the sphenoid has necrosed away. In such a case the dead bone is broken up *in situ*, and then removed piecemeal through either the anterior or posterior nares. It is only rarely that some such operation as that of Rouge is required.

POSTSYPHILITIC AFFECTIONS OF THE NOSE

The sequelæ of nasal syphilis which may be considered are the following:—

1. Stenosis and atresia of the vestibules.
2. Atrophic rhinitis.
3. Perforations of the palate.
4. External deformities.

1. Gummatous ulceration of the skin lining the vestibules of the nose is very prone to contract, so that complete obliteration of the orifice may be produced. This is generally avoided in cases which respond satisfactorily to active treatment. When stenosis threatens, a small length of rubber drainage-tube, of as large a bore as possible, is well smeared with a mercurial ointment (such as ung. hydrargyri oxid. flav. dil.), and worn in the nostril regularly, being changed night and morning. Or Francis's dilators (Fig. 61, p. 108) can be used in the same way.

The central columella of the nose is sometimes destroyed, so that there is only one common nasal vestibule. Or cicatrization and scar retraction may lead to much disfigurement by pulling down the end of the nose, and so reduce the lumina of the vestibules to minute circular orifices. A plastic operation, followed by the use of dilators, may be required to remedy this.

Operations for these deformities are generally very disappointing, owing to the low vitality of the flaps and their tendency to contract.

2. The condition of atrophic rhinitis which may be left by syphilis in the nose is described on p. 619. It requires the care and treatment recommended in the atrophy of ozæna (p. 129).

3. Perforations in the hard palate, if not larger than a cedar pencil, may close up if treatment is instituted as soon as they appear, and the margins are stimulated with nitrate of silver or chromic acid.

absorbed, or scattered, or replaced by fibrous tissue ; but in successful cases it has been found in position two years afterwards.

Operation.—The method employed by Harmon Smith has proved simple and satisfactory.* A tube of sterilized paraffin is placed in a water bath of a temperature 5° or 6° higher than its melting point of 115° F. A suitable syringe is sterilized, filled with the melted paraffin, and then lies in cold sterilized water until the surgeon is ready. The skin of the nose is thoroughly purified. No anæsthetic is required. An assistant stands behind the patient to make firm pressure with his forefingers round the root and sides of the nose, so as to prevent any leakage up towards the eyelids. The surgeon now immerses the syringe in hot water, and gives the piston several turns until the paraffin winds out in a hard, thin, cylindrical thread. He then introduces the needle subcutaneously, starting just above the depression, and injects steadily and slowly as the needle is withdrawn. About 2 cm. is sufficient. It is much better to inject too little and repeat on another occasion, than to introduce the least quantity too much. Laying down the syringe, the surgeon rapidly moulds the subcutaneous mass into the desired shape. A collodion dressing is placed over the site of puncture. Any reaction is met with iced applications. No further injection should be made for at least a month.

Dangers.—Cases of permanent blindness have been recorded, due to a paraffin embolus. The embedded mass has sometimes shifted to one side, or travelled into the loose tissue of the eyelids, whence it had to be removed by operation. These risks can, according to observers with large experience, be altogether avoided by due care.

Results.—Caution is required in advising this operation. In very slight depressions it should be avoided, as a worse deformity may be produced. In well marked and selected cases excellent and permanent results may be expected in experienced hands.† (Figs. 257 and 258, pp. 650, 651.)

* *Laryngoscope*, xviii., 1908, No. 10, p. 798.

† Tubes of prepared and sterilized paraffin of the required melting-point, as well as suitable syringes, are supplied by Mr. F. A. Rogers, 327, Oxford Street, London, W., and Messrs. W. F. Ford and Co., 315, Fifth Avenue, New York.

A tonsillar chancre is distinguished from a tertiary ulcer by being more on the surface, by the stony hardness of the whole tonsil, and by the enlarged cervical gland. The eruption of secondary rashes will settle the difference. The appearances of a breaking-down gumma are described at p. 633.

Prognosis.—The disease lasts from one to two months. It is commonly thought that the general infection is more virulent when inoculation takes place through the mouth or pharynx. There does not seem to be any justification for this view.

Treatment.—It is seldom that the diagnosis of a primary chancre of the pharynx is positively established before the appearance of secondary symptoms; but specific general treatment should be initiated as early as possible (*see* Chap. XLIX., p. 654). Locally, treatment consists essentially of cleansing measures. The tonsil should be frequently syringed or sprayed with warm alkaline lotions, and dusted with iodoform or similar powder. The patients who cannot conveniently do this should gargle with tepid salt-and-water.

The patient should be informed that, for the sake of others, he must scrupulously avoid all the direct or indirect methods of infection already referred to.

The chancre itself is treated as follows: After the surface has been thoroughly cleansed it is dried with cotton-wool mops, and the base of the sore is touched with the end of a glass rod, moistened with pure carbolic acid. A minute is then allowed to elapse for the carbolic acid to exert its local effect. The application is painless. Care should be taken that the surface is thoroughly dried, as this limits the action of the acid. Only a small quantity should be taken on the glass rod, from which it should not hang in a drop. At the end of a minute any superfluous acid can be wiped off with cotton-wool or a piece of blotting-paper. This application can be repeated, if required, when the eschar separates. The surface of the sore and tonsil, if coated with a tenacious slough or mucus, can also be cleansed by the addition of peroxide of hydrogen to the alkaline lotion. The patient should keep the teeth and mouth very clean, making frequent use of a gargle of chlorate of potash, corrosive sublimate (1-5,000), listerine, phenosalyl (1-3 per 1,000), etc. (p. 745).

A milder, though less effective measure, is to paint the sore with nitrate of silver (20 per cent.) or chloride of zinc (3 per cent.), or even with glycerinum acidi carbolici.

Recent observations on the marked power of mercurial ointment in aborting general infection from a primary sore, if employed early enough, would suggest the rubbing-in of an ointment of 1 part of mercury with 3 parts of lanoline; or the

symmetrical. Any suspicion of diphtheria can be eliminated by a bacteriological examination.

If the erythema occurs in adults in whom the tonsils were formerly small; if they enlarge rapidly; remain swollen longer than in a simple case of tonsillitis; and are accompanied by tender, hard glands, it would suggest the possibility of syphilis, although, in the absence of any history of infection, we may have to await the appearance of other secondary manifestations before deciding.

Prognosis.—Secondary symptoms yield very quickly to treatment. Otherwise they may last from two to six weeks, or even continue for two months. It is well to remember that they may reappear at any time within two years from the date of infection, and also that they may be present along with manifestations of the tertiary period, so that a breaking-down gumma and a mucous patch may come under notice together.

Treatment.—The infection of the secondary period is very virulent, so that the patient should be warned of the risk of conveying contagion in any of the ways mentioned (p. 625). The medical man must also guard himself carefully from any infection being coughed on to his face or adhering to his hands; and a special set of instruments should be kept apart for syphilitic cases, and carefully sterilized immediately after use.

The general treatment is by far the most important (*see* Chap. XLIX., p. 654). But local treatment must not be neglected, as it will not only relieve anxiety and discomfort, but will diminish the risk of contagion. Tobacco should be given up entirely, and alcohol must be taken sparingly, if at all. Spirits and liqueurs must be avoided. After every meal the teeth and gums should be brushed, and an alkaline and antiseptic mouth-wash employed; one of the best is made of equal parts of chlorate of potash gargle and lotio nigra (Formulæ 35 and 36). The patch itself is dried and painted with chromic acid (gr. x-xx to ʒi), tincture of iodine, or nitrate of silver (gr. x-xx to ʒi). If brushed with chromic acid (5-10 per cent.) and immediately afterwards painted with a 30 per cent. solution of nitrate of silver, a chromate of silver is formed *in situ*. In severe forms powdered calomel may be blown in, the sublimed calomel may be inhaled (p. 657), or the methods described for treating tertiary ulcers (p. 637) may be employed.

TERTIARY SYPHILIS OF THE PHARYNX

The pharynx is often the site of the most marked ravages of neglected tertiary syphilis. Yet its appearances are generally

wall, draws it forwards and fixes it by two silk sutures to the mucoperiosteum of the hard palate. Tilley carries out the same principle by threading the soft palate on both sides with strong silver wire and anchoring it to the incisor teeth. The wires cut out in ten to fourteen days, but by this time considerable healing will have taken place over the raw surfaces from which the adhesions had been separated.* After freeing the soft palate, H. B. Robinson prevents it from again uniting by the following method : " A piece of lead plate is cut the full breadth of the naso-pharynx and bent so that one arm rests on the dorsal surface of the soft palate, and the lower one on the buccal surface, the cut margin being received between the plates and apposed to the bend, and so kept away from the pharyngeal wall." The piece of lead is kept in place by silk threads attached to the four corners, two passing forward through the nostrils and two through the mouth. The lead plate is not removed for a fortnight.† The same principle of treatment is carried out by wearing an artificial tooth plate with a naso-pharyngeal extension as in Fig. 254.‡

Whatever method is employed to enlarge the stricture, dilatation must be kept up for some time by the frequent passage of the forefinger, a palate hook, or a dilatable bag.

Results.—Stenosis of the passage from the naso-pharynx to the meso-pharynx, and caused by syphilitic adhesions between the soft palate and the posterior pharyngeal wall, is one of the most difficult affections in the neighbourhood to operate on with satisfactory results. The cause of disappointment lies in the low vitality of specific scars and their well-known tendency to contract.

* *Proc. Laryngol. Soc., London*, x., March, 1903, p. 81.

† *Ibid.*, xiv., June, 1907, p. 106.

‡ *Journ. of Laryngol.*, May, 1905.

a rule, contemporaneous with general secondary lesions. Mendel concludes that, as a rule, secondary syphilis usually occurs in the larynx between the third and the fifth months from infection. It may only appear after one, two, or three years, and is apt to recur; but a syphilitic catarrh has no characters to distinguish it from an ordinary laryngitis.

Symptoms.—The chief one is a peculiarly painless and persistent hoarseness. Cough and dysphagia are seldom complained of.

Examination.—There is a general dusky laryngeal congestion. If it is mottled in character it is said to be suggestive of syphilis.

Mucous patches are very occasionally seen on the vocal cords or the lingual surface of the epiglottis, and may be followed by slight abrasions. Condylomata are said to occur.

Under treatment these symptoms tend to disappear rapidly, and leave no trace behind.

Diagnosis.—With few exceptions the diagnosis will depend on the recognition of secondary symptoms in the pharynx or elsewhere. When a chronic hyperæmic laryngitis is met with, which does not improve under ordinary remedies, the possibility of a syphilitic basis should be considered.

Treatment.—The secondary symptoms in the larynx speedily yield to general antisiphilitic treatment (Chap. XLIX., p. 654), combined with the local treatment suitable for laryngitis (p. 442).

TERTIARY SYPHILIS OF THE LARYNX

Tertiary syphilis occurs in the larynx in the forms of (1) **gumma**, (2) ulceration, (3) perichondritis and necrosis, (4) postsyphilitic induration, and (5) resulting scars and adhesions.

Invasion.—It may appear as early as the second year, or as late as the fiftieth, after infection.

Morbid anatomy.—1. A well-defined, circumscribed **gumma** is not very commonly met with in the larynx. But it may be found on the epiglottis, as well as in the ary-epiglottic folds, the neighbouring part of the ventricular bands, the arytenoids, or the cords. The surface is smooth, rounded, often irregular, and deep-red or purplish. A diffuse or a nodular gummatous infiltration is frequently met with (Fig. 255). Both these forms may be present together, and neither may come under notice until ulceration has commenced. Gummatous infiltration may take place in limited deposits (Plate XIII., Fig. 3). The epiglottis, the arytenoid area, or some other region may be attacked, or the whole inner surface of the larynx may be infiltrated. This form of syphilitic laryngitis is apt to occur after incomplete treatment, or to follow on repeated laryngeal attacks.

General treatment.—If the larynx is invaded acutely, rest to the voice, by silence, is of much importance, and general rest in bed may also be advisable. The diet should be light, consisting largely of milk. In all cases tobacco, spirits, and liqueurs should be discontinued ; light wine or beer may be allowed ; but the patient will do better without any alcohol.

Mercurial treatment should be given as soon as possible, although in cases without urgent symptoms, speedy relief can be secured by iodide. The latter drug may produce much irritation, profuse catarrh, and even œdema in some cases of laryngeal syphilis, so that its administration must be carefully watched. The choice of drugs, methods, and doses is given in Chap. XLIX., p. 654.

Local treatment.—In the larynx, as in the pharynx and nose, the general treatment is of the greatest importance. Local measures are often of secondary consequence, but at other times must be prompt and energetic. Unhealthy ulcerating surfaces should be sprayed with an alkaline lotion (Formulæ 8 to 10), or wiped with peroxide of hydrogen (10 volumes) or perhydrol (3 per cent.), and may then be dusted with iodoform, euophen, or other antiseptic powder. Pain and dysphagia may be relieved by insufflations of orthoform, anæsthesin, or morphia (Formulæ 4 and 6). Exuberant granulations may require treatment with the curette, or painting with nitrate of silver (gr. x-xx to 3i), sulphate of copper (gr. xx to 3i), or argyrol (25 per cent.). Œdema may be treated by sucking ice, or by scarification, or it may require a tracheotomy.

Tracheotomy may be necessary if there is decided or increasing glottic stenosis, generally indicated by stridor at night. In many cases, even when this operation is threatened, it will be found to be unnecessary if the patient is kept at rest in bed, and mercurial treatment is pushed actively by inunction or injection. In other instances this same treatment through the skin will act much more effectively when complete rest to the larynx has first been secured by a tracheotomy. The wearing of the cannula need not be looked upon as permanent in all cases, for mercurial treatment will sometimes be so effective that the tube can be dispensed with, even after being worn for years. If a tracheotomy does not promptly relieve the breathing it may be because the trachea is also involved by syphilitic stenosis. For this reason a tracheotomy should be performed as low as possible.

Treatment of sequelæ. Attempts at forcibly dilating a stenosed larynx should not be made in recent cases of ulceration, as acute perichondritis might thus be originated. A web of adhesion may be divided, and efforts made to keep the parts separated

CHAPTER XLVIII

SYPHILIS OF THE UPPER AIR-PASSAGES

(Continued)

HEREDITARY SYPHILIS

Synonyms.—*Congenital syphilis ; inherited syphilis.*

Inherited syphilis may appear in the secondary or the tertiary form.

SECONDARY MANIFESTATIONS OF INHERITED SYPHILIS IN THE NOSE, PHARYNX, AND LARYNX

Etiology.—Symptoms may be present at birth, but usually appear within from one to six weeks. They may be delayed to the third or even the sixth month.

Pathology.—This is the same as that of secondary syphilis in the acquired form, i.e. erythema and mucous patches.

Symptoms.—Attention is generally called to the condition by the presence of catarrh, generally referred to as “the snuffles.” The infant’s nasal respiration is noisy, or snoring, and owing to the nasal obstruction he is unable to take the breast for any time without letting go to draw a breath. The discharge from the nose may be thin and ichorous, but soon becomes thick, yellow, and blood-stained. Crusts may form and increase the obstruction. Cracks, weeping fissures, and ulcerations radiate from the *alæ nasi*. The nasal obstruction may lead to choking attacks. As the infant cannot suck properly he wastes rapidly (cf. Nasal Obstruction, p. 82).

Examination, owing to the smallness and the obstruction of the nasal chambers, is difficult ; but there is no evidence of actual destruction of cartilage or bone. Yet flattening and broadening of the bridge of the nose takes place. In the pharynx mucous patches and erythema have been noted. The harsh, weak cry suggests that there may be changes also in the larynx.* Tracheotomy for severe dyspnoea has been recorded. Confirmatory signs

* G. F. Still, *Practitioner*, July, 1904, p. 24.

puberty; the site of origin, the tendency to heal in one part and break down in another, the presence of skin lesions, and the absence of marked fetor, will distinguish it. Ozæna has much resemblance to congenital syphilis of the nose. A course of antisyphilitic treatment may help to distinguish them. Lupus in the pharynx and larynx is apt to be mistaken for inherited syphilis. But there are generally signs of it elsewhere—in the nose, or on the gums and skin; there is no surrounding inflammation; and it is found to be healing in parts. The tests of treatment and the microscope may also be required to complete the diagnosis.

In all cases confirmatory traces of infantile syphilis must be sought in the earthy-tinted skin, sunken nose, scars or striæ about the corners of the mouth, pegged and notched upper incisor and canine teeth, the sequelæ of interstitial keratitis, and choroiditis or nerve-deafness. The family history will often help the diagnosis.

Prognosis is good so far as regards the immediate results of treatment. But the possibilities of residual atrophic rhinitis, or pharyngeal stenosis, must not be forgotten.

General treatment.—This is fully described at p. 654. Inunctions of mercury, and occasional courses of iodide of potassium, may be required according to the symptoms and progress. Tonic treatment is particularly necessary in the hereditary form—iron, arsenic, cod-liver oil, good food, open air.

Local treatment.—In the nose, cleansing measures are most important, and are carried out as directed in the chapter on Atrophic Rhinitis, p. 129). In the pharynx they are of subsidiary consequence and are frequently uncalled for. They will be directed on the same lines as for the acquired form (p. 632).

IN THE LARYNX

Inherited syphilis appears in the larynx comparatively seldom. But it may occur within the first two months of life in the form of perichondritis,* and later in the form of localized thickenings, hypertrophy, ulceration, or perichondritis.

In late hereditary syphilis in the larynx, the various forms of hyperplasia are thus classified by Brown Kelly:—

1. Hyperplasia associated with ulceration, frequently seen as thickening at the periphery of ulcers or scars.

2. Hypertrophic granulations and papillary excrescences, which may or may not be preceded or followed by ulceration: the condition is most frequently seen on the epiglottis, and resembles lupus.

* Isidor Frankl. *Wien. med. Woch.*, 1868, No. 6, p. 1129.

CHAPTER XLIX

GENERAL TREATMENT OF SYPHILIS

Hygiene and diet.—The hygienic and dietetic care of a syphilitic patient is of great importance. Healthy subjects who are well fed, in clean and comfortable surroundings, and able to spend much time in the open air, will make much more certain and rapid progress than the debilitated, dirty, debauched, starved, overworked, or sedentary.*

When possible the patient should be prepared for treatment by a visit to the dentist, so that the teeth may be scaled or filled, and the gums rendered as healthy and firm as possible. Teeth and gums should be well brushed after each meal with a practical powder, such as camphorated chalk, and the mouth rinsed out frequently with an acetate of alum or chlorate of potash gargle (Formule 30 and 35). When the gums are sound there need be little fear of stomatitis.

It is well to discontinue alcohol and tobacco. Possibly a little wine or beer might be allowed with meals, but I am certain that smoking retards recovery in all cases, and particularly in secondary affections. Food should be nourishing, varied, and plentiful. The skin must be kept in good order by baths, supplemented, if necessary, by radiant heat, or hot-air baths. The weight of the patient is regularly taken, for it is a good index of progress, increasing when treatment is acting well, and decreasing in unpromising cases. In the latter event the method of treatment must be modified or altered. Sometimes all specific treatment should be discontinued for a while, and a course of tonics of quinine, nux vomica, iron, arsenic, and cod-liver oil substituted.

Much of the success which is obtained by the inunction cures at Aachen, Wiesbaden, Luchon, and elsewhere is undoubtedly attributable to the simple and regular life, change of scene, open air, and rest from work and worry.† For those who cannot command these favourable conditions, such as hospital out-patients, the improvement wrought by admission to the wards, and a few weeks' rest in bed, is often remarkable.

Prognosis.—The patient should be advised that it may take from two to four years before a lasting cure can be hoped for.

ADMINISTRATION OF MERCURY

It was formerly the custom to prescribe mercury only for the secondary stage of syphilis, and iodides for the tertiary. I have pointed out for many years that the rule was not, at any rate, applicable

* F. H. Douty, *Brit. Med. Journ.*, Feb. 28, 1903.

† A. Leven, *Laryngoscope*, May, 1898, and May, 1903.

after the first, second, and third courses, and a three months' break between the fourth and fifth course. Jonathan Hutchinson makes the course last at least one year without intermission. He gives a pill containing 1 gr. of hydrarg. c. cretâ and 1 gr. of Dover's powder, three times a day after meals. The number of pills is increased, if there is no diarrhœa, to four, five, or six a day.*

Plummer's pill is suitable for long-continued treatment in doses of 2½ gr. twice a day.

Blue pill (pil. hydrargyri) is sometimes given in doses of 1 to 3 gr.

The liquor hydrarg. perchloridi can be given in doses of ½ to 2 drachms.

In cases where we wish to try the effects of specific treatment without the patient knowing it, we can simply prescribe a teaspoonful of "Sirop de Gibert" three times a day.†

The "Liquor Donovanii," in doses of 5-20 minims, can be used in the same circumstances; and it is also a useful method of prescribing arsenic and iodides as well as mercury.

2. **Inunction.**—The ointment recommended for use in the British Army is made as follows:—

℞ Ung. hydrargyri	.	.	.	.	gr. xl
Adipis lanæ	.	.	.	.	gr. xx

Mix thoroughly, and wrap in wax paper, for a single dose. I advise that sufficient ointment for six inunctions be freshly made each week with lanoline and fresh benzoated lard. The ung. hydrargyri can be used, commencing with the dose of 30 gr., and increasing it to 60 gr. when it is found to agree. A warm bath should be taken before each rubbing. If this is impossible, the site of inunction is well washed with soap and water. Suitable areas are the flexor surface of the forearms, the flanks, and the inner surface of the lower thigh. Each of these six areas is used once a week, leaving one day without an inunction. The packet of ointment is spread over the warm, washed skin with a wooden spatula or paper-cutter. The act of inunction should last at least 30 minutes. Under-garments are worn of a quality which will allow of their being burned at the end of a week, as they cannot very well be sent to the laundry.

The course, as recommended for use in the Army, is spread over two years, viz. the first and second courses of 42 daily inunctions with a three months' interval between the first and second, and the second and third. The third course involves 30 daily inunctions, followed by an interval of six months. Then comes a fourth course of 30 daily inunctions, followed by another break of six months, ending up with a fifth course of 20 daily inunctions.‡

In some cases the milder and pleasanter oleate of mercury (10 per cent. , in doses of 2 drachms, can be rubbed in twice a day.

3. **Calomel baths** are simply arranged by seating the patient on a cane chair, enveloped (except for the head) with a sheet and macintosh, and placing underneath the chair a spirit-lamp and saucer on

* *Practitioner*, Aug., 1904, p. 145.

† ℞ Hydrargyri iod. rubr.	.	.	.	.	gr i
Potass. iod.	.	.	.	.	ʒiii
Aq. destill.	.	.	.	.	ʒi
Syrup	.	.	.	.	ad ʒiv

‡ *Brit. Med. Journ.*, April 14, 1906, p. 874.

is given because it possesses the peculiar property of promoting absorption of inflammatory products and infiltration. It is more beneficial the later the stage of the disease. It is suitable for virulent cases, or very resistant cases, but is more particularly indicated when they begin to yield. The drug can be given in doses up to 30-60 gr. three times a day in gumma of the nose, threatening perforation of the hard or soft palate, or in laryngeal cases with adequate air-way. It is administered in intermittent courses lasting ten days to three weeks, and suitable times are the intervals between the courses of inunction.

One may commence with a small dose, always well diluted. It is generally taken after food, but if given half an hour before meals a small dose will act more promptly than a large one on a full stomach. The addition of ammonia increases the efficacy of the drug, and a mixture with alkalis and nux vomica tends to prevent iodism. In debilitated subjects iodide can be prescribed with iron, quinine, or other tonics (Formula 60). It is often given in a mixture with mercury, so that an iodide of mercury is freshly formed; care should be taken that the iodide is in excess (Formula 61). Patients must be watched for the occurrence of iodide rashes, and nasal or laryngeal catarrh (cf. p. 113). The syrup of hydriodic acid (Gardner) may be found effective in patients who are intolerant of iodides. Iodoglidine—a combination of iodine with the albumin of wheat—is greatly extolled by German authorities. Its slow absorption precludes abrupt flooding of the tissues with iodine. It is given in half-gramme tablets by the mouth.

Iodipin may be used as a substitute for iodide of potassium. A 10 per cent. solution is given internally in gelatin capsules, in doses of 3 to 4 teaspoonfuls daily, or a 25 per cent. solution is given hypodermically in doses of 15 to 20 c.c., injected daily.

Sarsaparilla is of value, and appears to be especially useful when prolonged mercurial treatment has habituated the body to mercury.

Arsenic is a valuable remedy in many chronic cases. As cases of blindness have been traced to the use of arylarsonates, these drugs are not free from danger. Ehrlich-Hata's salvarsan, "606," has been introduced so recently that its value and indications are not fully established; but it promises to be an effective remedy.*

The Zittmann treatment, by sweating and purgation,† is frequently successful in malignant cases, which are not improved, and are sometimes made worse, by mercury and iodides.

* J. E. R. McDonagh, *Lancet*, Sept. 3 and Oct. 22, 1910.
L. F. Knuthsen, *Practitioner*, Dec., 1910.

† *Ibid.*, Aug., 1904.

and the fact that cases nearly always occur in those exposed to contact with horses. Diagnosis is very difficult in chronic cases, and most cases are at first treated as syphilitic. The following points must all be taken into consideration: (1) The disease nearly always occurs in those exposed to contact with horses; (2) local symptoms are preceded by an irregular febrile attack of uncertain nature; (3) subcutaneous and muscular abscesses occur; (4) the pharyngeal ulceration strikingly resembles that of syphilis, but there is more ulceration with less infiltration; (5) daily variations of temperature are marked; (6) stigmata of syphilis may be present or absent; (7) laboratory and clinical tests for syphilis will assist. The *Bacillus mallei* is easily detected in the nasal discharge. Diagnostic injections of mallein (Mx-xv) may be employed.

Treatment.—Precautions should be taken by grooms and others who have to approach a horse with glanders. Infection from a human patient must also be guarded against. The treatment can only be symptomatic; attention must be paid to cleanliness, relief of discomfort, and maintenance of the patient's strength. Vaccine treatment might be tried. Of the many drugs which have been employed, mercury is the only one which can claim success with any show of reason.

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LEPROSY OF THE UPPER AIR-PASSAGES

Tubercular leprosy is manifested in the nose and throat by the symptoms of epistaxis, hoarseness, alteration of voice, and dyspnœa.

In anæsthetic leprosy the throat is rarely affected, and not until the disease has lasted at least five years. Then there may develop anæsthesia of the palate and pharynx, with paresis and atrophy.

Infection.—Leprosy is only met with nowadays in this country in individuals who have been exposed to the risk of contagion with lepers. It is important to remember that a patient may return from the East and not develop symptoms of leprosy—at least, not sufficient to attract attention—for ten or more years.*

Invasion.—The disease is very insidious, doubtless because of its painlessness and slow progress. It is thought that the initial lesion of the disease consists of a specific affection of the mucous membrane, usually in the form of infiltration and ulceration on the cartilaginous part of the nasal septum. This is often present in the latent stage of leprosy for years before the appearance of the first tubercles in the skin, or the development of the first nervous symptoms. If nasal catarrh and bleeding are overlooked, the development of a nasal tone in the voice may be the first symptom to direct attention to the air-passages, although examination may then reveal extensive disease.

* J. R. Ball, *Proc. Laryngol. Soc.*, London, Nov., 1893.



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the petiolus, and the region just above and below the anterior commissure of the vocal cords. The epiglottis, the ary-epiglottic folds, and the ventricular bands are also infiltrated, nodular, ulcerated, and contracted. The arytenoids and ary-epiglottic folds may be occupied by two irregular, pear-shaped swellings, with an uneven and nodular surface, and so approximated as greatly to narrow the laryngeal orifice.* The epiglottis is often distorted or curved on itself, wasted to a mere knob, and so contracted that the interior of the larynx is invisible, and the opening leading to it reduced to a small, circular orifice. This condition will markedly alter the voice and render the respiration noisy and stridulous, yet, in spite of extensive disease in the larynx, the vocal cords may long remain normal.† In later stages they ulcerate and partially cicatrize. As a matter of practice, although dyspnœa is a common symptom, tracheotomy is seldom required.

Leprous nodules may also occur in various parts of the larynx varying in size from a pin's head to a pigeon's egg. They vary in appearance, and may be smooth, or nodular, and sometimes resemble papillomata.

Paul Bergengrün (Riga) states that they are always anæsthetic.‡ The anæsthesia of the surface is characteristic.

Diagnosis.—Leprosy in the air-passages is apt to resemble lupus tubercle, and syphilis. Cancer is not likely to be mistaken for it. Difficulty in distinguishing it could only occur in the very early stages of the nasal infection, and then the detection of the bacilli in the muco-purulent rhinitis would lead to recognition. Later on, the slow progress, the presence of cutaneous phenomena and anæsthetic areas, would remove all doubt.

Treatment.—Local cleanliness and disinfection must be carried out with warm alkaline lotions and oily sprays (cf. Treatment of Atrophic Rhinitis and Laryngitis Sicca, pp. 134 and 455). A spray of 1 per cent. resorcin and iodoform has been recommended. The similarity of the process to lupus would suggest the use of the galvano-cautery. Tracheotomy may be required.

Great care should be taken to avoid direct or indirect contact with the secretions from the mouth or nose of a patient with leprosy.

For further information readers are referred to special monographs or textbooks of general medicine.

* J. B. Ball, *Proc. Laryngol. Soc., London*, Nov., 1893.

† Arthur Evans, *Proc. Roy. Soc. of Med., Laryngol. Section*, i., Dec. 6, 1907, p. 16.

‡ *Proc. Laryngol. Soc., London*, v., March, 1898, p. 54.

it may originate, and remain more or less limited, in the naso-pharynx or the larynx, or it may be met with only in the trachea.*

Symptoms.—When the nose is attacked, the symptoms are those of painless and slowly increasing obstruction and catarrh, going on to complete stenosis. In the larynx the affection produces catarrh, cough, hoarseness, expectoration of crusts, dyspnœa, stridor, and eventually stenosis. This sequence may be spread over fifteen or twenty years, and the prodromal catarrh may persist for years before the formation of scleromatous infiltration. It is rare for the trachea and bronchi to be affected, except in late stages. The disease is said to have a characteristic smell, similar to that of ozæna.

Examination.—A hard infiltration, frequently concealed by muco-pus or crusts, may be met with anywhere in the nose or naso-pharynx. There is no bleeding or ulceration. The infiltration tends to recur slowly after removal. It may completely block the nose, or form a diaphragm across the naso-pharynx. In the larynx scleroma generally attacks the subglottic area, beginning anteriorly as a subcordal infiltration and spreading towards the interarytenoid region. The tumefaction is at first pale-red in colour, and then white and smooth, and may be connected with the under surface of the cords or separated from them by a groove. Some cases described as “chorditis vocalis inferior” are doubtless scleroma. Diffuse infiltrations, nodules, or gummatous masses may also appear around the glottis, the vestibule of the larynx, or ary-epiglottic folds, and are rarely unilateral. The stenosis is apt to be increased, and suffocative attacks induced, by the formation of crusts, which are expelled with difficulty.

Diagnosis.—The disease has been mistaken for carcinoma or acne rosacea, especially if located in the alæ nasi. It may also require differentiation from syphilis or lupus. The diagnosis is based on the long history, slow development, absence of pain, stony hardness, dry secretion, tendency to recurrence, and the pathological findings of hyaline bodies, Mickulicz cells, and pure cultures of a mucoid, Gram-negative, capsulated bacillus, belonging to the Friedländer group.

Atrophic rhinitis, with concentric narrowing of the postnasal space, would be characteristic of scleroma.

Prognosis and infection.—The prospect of complete cure is poor. The general health may not be impaired, unless stenosis becomes marked. The disease progresses slowly, or remains

* Hermann von Schrötter, “Contribution à l’Étude du Sclérome de la Trachée.” *Ann. des Mal. de l’Oreille*, xxvii, 1901, No. 3, p. 221. (Gives a large bibliography.)

PART IX.—ACUTE SPECIFIC FEVERS IN THE NOSE AND THROAT

CHAPTER LI

THE nose and throat are portals of infection for the majority of infectious fevers; many of them have characteristic manifestations there. In some, like diphtheria, these local developments are of the greatest importance; and even when the infection takes place through the alimentary canal, as in enteric, the complications in the larynx are noteworthy.

These throat complications have often many features in no way characteristic of the fever causing them, and readers are then referred to the chapters on acute rhinitis, pharyngitis, and laryngitis. But some peculiarities are worth referring to, and the conditions incident to each fever will be summarized, while in the case of diphtheria a fuller, but necessarily abbreviated, description of the whole course of the disease seems desirable.

MEASLES

Acute catarrh is a characteristic feature of measles. In the prodromal stage there is dark congestion and dryness of the pharynx and fauces, with an eruption of minute, red, punctiform or granular spots on the roof of the mouth and the palate. More characteristic are Koplik's spots, which usually appear on the buccal mucous membrane and gums opposite the molar teeth. They are minute white spots with a red areola; they cannot be wiped off; they vary in number from two or three to several hundreds; and are invariably discrete. They appear about the second day, and fade as the rash comes out. Twenty-four hours after the commencement of these prodromal symptoms acute rhinitis occurs, with intense irritation, sneezing, and profuse catarrh. The rash follows this in twelve to twenty-four hours, but may be delayed till the third or fourth day. Meantime the catarrh, photophobia, lachrymation, and general discomfort subside; but with the appearance of the rash these symptoms return with increased severity, and to

white and tough like wash-leather. When a membrane appears later in the fever, i.e. two or three weeks from its commencement, it is usually true diphtheria, to which scarlatina convalescents are very susceptible.

3. Phlegmonous angina, or scarlatina anginosa. This form may be marked from the beginning, but more frequently arises during the height or subsidence of the rash. It is an acute septic pharyngitis and laryngitis. There is rapid destruction and sloughing of the structures in the pharynx and nose; profuse muco-purulent rhinorrhœa; acute and destructive purulent otitis media; and ulceration and necrosis of the soft palate, fauces, and tonsil.

The larynx is often invaded, with the production of œdema, laryngeal perichondritis, necrosis of the cartilages, and subsequent stenosis. The submaxillary region is swollen and brawny, and there is diffuse septic cellulitis spreading down the neck. This last is a very grave affection, many patients dying between the seventh and tenth day, generally from the profound toxæmia. Although the throat condition may cause dyspnœa and threaten asphyxia, death more commonly results from cardiac failure.

For treatment the reader should consult the several sections on the acute inflammations in the nose (p. 113), pharynx (p. 389), and larynx (p. 442), as well as those on septic sore throat (p. 407) and on diphtheria (p. 676). In septic or gangrenous conditions, freshly made chlorine solution or peroxide of hydrogen (10 volumes) is useful locally, while antistreptococcic serum should be tried.

VARIOLA

Epistaxis may occur in the early stages of malignant smallpox. In the prodromal stage there is a catarrhal condition causing lachrymation, sneezing, and hoarseness, and these early symptoms are liable to be mistaken for those of measles (p. 668). From the third to the sixth day the eruption appears in the nose, hard and soft palate, fauces, and pharynx. It is sometimes seen in the larynx, and even in the trachea. The rash comes out at the same time on the skin and mucosa. The pocks appear in the throat as discrete, white or grey vesicles, which soon break down into superficial ulcers. These may coalesce into larger areas, which may then become coated with a dirty-grey membrane. In the larynx the eruption produces a laryngitis which is not, as a rule, severe; but later on, when the skin eruption has reached its greatest intensity, acute laryngitis with hæmorrhage, œdema, pseudo-membranous laryngitis, perichondritis, necrosis, and severe

LARYNGEAL COMPLICATIONS

Frequency.—The proportion of cases in which the larynx is involved is thus given by different authorities:—

Landgraf	.	.	11	per cent. of all fatal cases.
Griesinger	.	.	26	" " "
Kanthack	.	.	26	" " "
Ouskow	.	.	30	" " "

Lüning (quoted by Dupuy) estimates the frequency at 3 per cent. from clinical statistics, and 17 per cent. from post-mortem examinations.* These figures show that this complication is frequently overlooked in life, not seldom owing to the semi-comatose condition of the patient, for, as Trousseau pointed out, the affection is especially likely to occur in protracted cases of an adynamic type. In these it is probably one of the causes of death.

Etiology.—It has been pointed out that, with few exceptions, all the recorded cases occurred in young men.† There seems to be no relationship between the symptoms of the fever and the laryngeal complication, nor do these lesions invariably appear during the acute period of the fever. Ulceration usually occurs about the third week, but laryngeal complication may develop during convalescence, even as late as two months after the termination of the fever. The dorsal decubitus is regarded by some as a predisposing factor.

Typhoid ulcers in the larynx may be due to: (1) Fresh infections with pyogenic organisms, acting on debilitated tissues; (2) invasion by the Eberth bacillus, as found by Watson Williams and others in typical typhoid laryngeal ulceration;‡ or (3) mechanical causes, from attrition of the inflamed and infiltrated mucosa.

Symptoms.—The invasion of the larynx in enteric may be insidious, an apparently mild laryngitis being suddenly followed by alarming dyspnœa and spasm. The necessity of examining the larynx is indicated by any huskiness, hoarseness, stridor, metallic cough, dysphagia, or difficulty of breathing.

Examination.—The local changes in the larynx seen in enteric may be those of (1) submucous laryngitis, (2) ulcerative laryngitis, (3) laryngeal perichondritis, (4) paralysis of the vocal cords, or (5) ankylosis of the crico-arytenoid joint. These conditions may overlap one another, and may, rarely, be complicated with œdema. Necrosis, following perichondritis, is the commonest, as it is the most serious, of possible complications of typhoid fever. It most frequently involves the cricoid, and, next to this, the arytenoid cartilage (Fig. 200).

Ulceration comes next in frequency, though some observers

* *Arch. f. klin. Chir.*, xxx., 1884, pp. 225 and 523.

† George Dutley. *Dublin Journ. Med. Sci.*, March 1, 1898, p. 185.

‡ *Brit. Med. Journ.*, Dec. 15, 1894.

operated on the death-rate was 58 per cent., and of the unoperated 76 per cent.*

In many cases the paralysis, or destructive process in the larynx, leaves permanent damage there.

Treatment.—More attention than that usually given in enteric to the care of the nose, throat, and mouth might avoid some of the complications described. The catarrh and the epistaxis should be treated as already described (pp. 118 and 100). Laryngitis is met by ordinary cleansing and sedative measures (pp. 442 and 446), but once there are symptoms of ulceration, perichondritis, or stenosis, there should be no hesitation in performing tracheotomy. The tracheal cannula should be inserted before the indications are urgent (p. 722). This is particularly indicated in the necrosis which so frequently follows perichondritis, when the mortality, without operative relief, amounts to 95 per cent. Intubation should be avoided; for in perichondritis or necrosis it causes pressure, traumatism, and interference with the escape of pus and necrotic tissue.

The tracheotomy cannula can be dispensed with afterwards in some cases, in periods varying from seven months to six years; the local infiltration, in the meantime, being assisted in its absorption by small doses of iodide of potassium, or injections of fibrolysin, with attention to local causes of catarrh, vocal and respiratory gymnastics, and visits to Ems, Mont Dore, Cauterets, or similar health resort. If the remaining stenosis is so marked that the tracheotomy tube cannot be dispensed with, the chapter on Laryngeal Stenosis should be consulted (p. 536).

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- There are several references in the article by Sir George Duffey referred to on p. 672.

INFLUENZA

Catarrhal affections are no necessary part of an influenzal invasion, although doubtless the infection in all cases enters through the air-passages.

In the upper air-tract influenza may cause (1) inflammatory affections, (2) neuroses.

* W. Rieser. *Amer. Journ. Med. Sci.*, Feb., 1908.

For treatment, the reader is referred to the various sections in which the conditions described are fully dealt with (sinusitis at p. 222, pharyngitis at p. 392, laryngitis at p. 442, and neuroses of the nose or pharynx at pp. 176 and 424).

DIPHTHERIA

Definition.—An acute, specific, infective disease, caused by the Klebs-Löffler *Bacillus diphtheriæ*.

The local lesion is a membranous inflammation, usually in the throat or upper air-passages, although other mucous or wounded surfaces may be affected.

Etiology. Sex.—Diphtheria is said to be more common in females, this preponderance being attributed to the greater risk of contamination from household duties and the more frequent habit of kissing.

Age.—The statistics of notification show the heaviest incidence of the disease between the years of 3 and 5. Between the ages of 5 and 8 children are passing from a condition of high susceptibility to one of relative immunity.*

Local predisposing causes.—Enlarged tonsils and adenoids, chronic diseases of the nose and throat, and mouth-breathing favour infection. Children convalescing from scarlatina, especially in hospital practice, are peculiarly susceptible to invasion by the diphtheria bacillus.†

Infection is generally by direct contact. It may be inhaled, or transmitted by kissing. It can be carried by drinking or eating utensils, broken food, bedding, clothing, pencils, slates, toys, books, etc. It clings more in damp and ill-aired premises. Milk forms an excellent culture medium for the bacillus, and if infected it may spread an outbreak. A similar affection in cows, cats, pigeons, and turkeys has been looked on as the source of some cases. Schools are a fertile field for disseminating infection.

The season of the year is not without influence, the disease being more common in October and November. A water-logged condition of the soil and dampness favour the occurrence of diphtheria.

The bacillus.—In 1883 Klebs discovered the specific cause of diphtheria, and in 1884 Löffler succeeded in isolating the bacillus and growing it in pure culture. The work of Roux, Yersin, Ehrlich, and Behring in 1889–94 resulted in the discovery of the antitoxic serum.

The bacillus varies in appearance. It is a delicate, long, straight, or slightly curved rod, about the same length as the tubercle bacillus, but twice as thick, clubbed at one or both extremities, and measuring 3 or 4 μ in length. It stains irregularly, Löffler's methylene blue being the best fluid. It is also Gram-positive. Collected by rubbing or rotating a sterile swab on the membrane, it grows on blood-serum and all the ordinary culture media in twelve to eighteen hours in the form of single, white colonies.

The significance of the Klebs-Löffler bacillus in the throats of healthy

* J. Thomas, *Brit. Med. Journ.*, Aug. 27, 1904, p. 431.

† Egerton H. Williams, *ibid.*, Dec. 21, 1901, p. 1799.

generally indicates a severe type of disease. It is not always easy to see membrane in the nasal cavities, although shreds or casts of it may be expelled. The nose becomes occluded with sero-fibrinous exudation, with a purulent, muco-sanguinolent, and possibly offensive discharge, excoriating the alæ and upper lip and containing diphtheria bacilli which are apt to persist for weeks or months, and so constitute a latent source of infection.

Primary nasal diphtheria is more common in nurslings than at a later stage of childhood. It is then characterized by the absence of symptoms of general intoxication, by a tendency to remain limited to the nasal cavities, and by the prognosis being more favourable. Many cases are indistinguishable from hereditary syphilis, except by bacteriological examination. Every suspected case calls for the administration of 1,000 units of antitoxin.*

But, in addition to nasal diphtheria with membrane formation, a rhinorrhœa may occur as a prodromal symptom. When a transitory as well as an early symptom, it generally indicates a mild attack. But if the nasal discharge is late or persistent, the faucial attack is usually severe.†

Laryngeal diphtheria may be primary, but more commonly it is an extension from the pharynx. It is indicated by hoarse voice and cough, inspiratory stridor, cyanosis and recession of chest-walls. At first there are paroxysmal attacks of inspiratory dyspnœa, but the interference with respiration tends to become continuous and progressive, being indicated by retraction of the chest-walls, cyanosis, restlessness, cold sweats, collapse, and death by asphyxia or cardiac failure.

The membrane may extend to the trachea and bronchi, and more rarely invades the œsophagus.‡

Paralysis usually appears in the third week, but may develop as early as the seventh day or be deferred until the sixth week or later. Paralysis is more likely after a severe than after a mild local manifestation. It is generally motor, but may also be sensory. The degree varies from slight paresis to absolute loss of power. It is apt to spread. The sphincters are not affected, but deep reflexes are lost, and the muscles waste. It may last six to eight weeks, or longer. The soft palate is usually first attacked, leading to nasal voice and regurgitation of food through the nose. Sensation is impaired, so that the palate can be tickled without exciting any reflex contraction. The palatal paresis is also demonstrated by

* Mensi, *Brit. Med. Journ. Epitome*, June 20, 1903, p. 97.

† T. D. Rolleston, *Metropol. Asylums Board Ann. Rept.*, 1906.

‡ F. E. Field, *Lancet*, Jan. 19, 1907.

Follicular tonsillitis

Exudation easily removed; does not leave a bleeding surface, and does not re-form.

Usual for both sides to be about equally involved.

Glandular enlargement about the same on both sides.

Pyrexia greater, from 100° to 104° F. and higher.

Constitutional disturbance more severe.

Vomiting uncommon.

Rhinorrhœa and albuminuria are uncommon.

Bacterioscopic examination of swabs from nose of pharynx is negative as regards the diphtheria bacillus.

Faucial diphtheria

Membrane adherent, leaves a bleeding surface, and reforms in a few hours.

Often more marked on one side than the other.

Glands more marked on one side.

Fever moderate, from 99° to 100° or 101° F.

In a case sufficiently mild to be mistaken for follicular tonsillitis the general symptoms would be much slighter.

Vomiting not infrequent.

Rhinorrhœa and albuminuria are frequent symptoms.

Hoarseness, stridor, or a croupy cough are suggestive.

Paralysis, or cardiac disturbance in a later stage, indicates diphtheria.

The Klebs-Löffler bacillus present in rhinorrhœa and faucial exudation.

Although the usual appearances and character of the diphtheritic exudation is that of a membrane like wash-leather, still it may be creamy, readily detachable, or even entirely absent. On the other hand, membrane-like exudation may occur in Vincent's angina, syphilitic ulcers, pneumococcic or streptococcic infections, and in some cases of follicular tonsillitis. The clinical features, confirmed by the presence or absence of the Klebs-Löffler bacillus, will determine the diagnosis. Cases of scarlatina anginosa, in which the rash is delayed or absent, are frequently diagnosed as diphtheria. But they are distinguished from diphtheria by continued pyrexia, restlessness, delirium, extensive inflammation of the fauces and greater swelling. There is no definite membrane, the throat is very painful, antitoxin has no effect, and the patient wastes rapidly.

Cases of mucous patch (p. 629), tertiary ulcer (p. 632), herpes (p. 692), keratosis pharyngis (p. 383), and acute tuberculosis (p. 585), have been brought under my notice with the mistaken diagnosis of diphtheria. Attention to the history and character of these affections, and the negative finding of the Klebs-Löffler bacillus, should prevent any such error.

Diphtheritic laryngitis is distinguishable from the stridulous

diarrhoea, collapse, with cold and pulseless extremities; hæmorrhage; suppression of urine; bronchitis; broncho-pneumonia.

Heart-failure from toxæmia occurs in the first fortnight; later on it is generally induced by strain.

The presence of adenoids or tonsils increases the dangers of the case. In 38 autopsies of diphtheritic patients Cottier found adenoids in 50 per cent.*

The value of the antitoxin treatment is so generally accepted that it is hardly necessary to quote evidence in its support. It has reduced the child mortality in London from 30 to 10 per cent., in New York City from 30—40 per cent. to 12—14 per cent., and in Paris from 45 to 12—15 per cent.

Antitoxin treatment.—Antitoxin should be given as early as possible, and in an efficient dose. Statistics abundantly prove that the death-rate increases in exact ratio to the delay in administering the remedy. When given in the first twenty-four hours of the disease the death-rate does not exceed 5 per cent., and is frequently nil; if not given before the fifth day the mortality averages 12 to 20 per cent. Early administration of antitoxin also diminishes the risk of development of paralysis, and this, if it does occur, is then only of a very limited and harmless extent. It also prevents the spread to the larynx. As to dosage, there is some diversity of opinion between those who recommend a massive dose, and those who advise that in cases of moderate severity only a moderate dose should at first be given, and be repeated if necessary. Not less than 2,000 units should be injected for a dose, in any case. It is pretty generally agreed that it is more efficacious to give one large dose as early as possible, instead of a number of small doses at intervals. Hence it is well to start with an injection of 4,000 to 6,000 units, repeated every twelve to twenty-four hours, according to the urgency of the symptoms, until such time as the membrane shall have become definitely shrunken, and be obviously separating. The milder cases will, therefore, usually receive a couple of doses, and occasionally but one, whereas in severe attacks the number of injections given will be from three to five. In any case, nothing is gained by giving more than 8,000 units at a time, and it is quite possible that sufficient antitoxic effect may be maintained with subsequent doses of half that amount.† No regard should be paid to the age or size of the patient, the dosage being guided by the urgency of the symptoms and the stage at which the treatment is commenced‡

* Quoted by J. D. Rolleston, *Med. Press*, July 3, 1907, p. 10.

† F. Foord Caiger, *Brit. Med. Journ.*, Oct. 8, 1904, p. 902.

‡ E. W. Goodall, *ibid.*, Oct. 8, 1904, p. 896.

Liquids—food, mucus, saliva, and discharges from the nose and throat—frequently pass through the tube and may cause broncho-pneumonia.

The tube may get blocked.

The tube may be expelled and the patient asphyxiated before it can be reintroduced.

It may cause ulceration, with immediate septic results, and the more distant possibility of stenosis.

It may be coughed up and swallowed.

Or it may pass through the glottis and become impacted in a smaller bronchus.

The *advantages* of *tracheotomy* are these :—

It is an operation which is well within the province of every practitioner.

If performed in good time, as it ought to be, it is free from the hurry and anxiety which used to be associated with the operation when done *in extremis*.

It can be performed painlessly and calmly under cocaine (*see* pp. 71 and 724), or light chloroform anæsthesia. Patients who are old enough to compare and express their experiences much prefer it to the distressing feeling of intubation.

Once successfully performed, a tracheotomy relieves a patient of the danger of asphyxia, as the inner tube can easily be cleaned and replaced by the nurse.

Pieces of membrane are more easily expelled or extracted through a tracheotomy wound than through an intubation-tube.

The larynx gets complete rest.

The *disadvantages* of *tracheotomy* have already been indicated, and the risks and complications associated with it are described at p. 727.

The conclusion which this comparison points to is that tracheotomy is indicated in private practice. In hospitals, where constant medical attendance is assured, intubation is preferable. In hands equally skilled at both operations the success of intubation is more marked.* In country practices it would be well to intubate every case of laryngeal diphtheria as soon as it is diagnosed, provided that obstruction is not very marked, in which case tracheotomy will be safer. Tracheotomy gives better results in rickety children.†

Cases unsuitable for intubation.—These are severe involvement of the fauces and nasal passages, œdema of the larynx, suspicion of membrane low down in the trachea, moribund condition from obstruction (which might be dangerously increased by temporary blockage), broncho-pneumonia.

After-treatment: intubation.—The intubation tube should be removed as soon as possible, generally on the third day. In most cases it is not necessary to replace it. Its presence generally requires the feeding of the patient through a nasal tube, but I have found that children, even as young as 4, may learn to take nourishment in the Wolfenden position (p. 000).

Tracheotomy.—A tracheotomy should be performed as low down as possible. In most of the cases in which it is found impossible to

* E. W. Goodall, *Brit. Med. Journ.*, Oct. 8, 1904, p. 896.

John H. McCollom, *Boston Med. and Surg. Journ.*, clii., 1905, No. 22, pp. 621-630.

† Comba and Simonetti, *Wien. med. Blätter*, 1899, No. 37.

PART X.—THE NOSE AND THROAT IN SOME GENERAL AFFECTIONS

CHAPTER LII

**GOUT. RHEUMATISM. MYXŒDEMA.
ACROMEGALY. ANGIO-NEUROTIC ŒDEMA.
HERPES. PEMPHIGUS. EXUDATIVE ERYTHEMA**

GOUT

THE word "gout" is still too often the refuge of the scientifically destitute. It is frequently applied, without sufficient justification, to granular or lateral pharyngitis, chronic lacunar tonsillitis, or catarrhal and spasmodic laryngitis. A patient may have the gouty diathesis, but this, although it would justify suspicion, does not necessarily mean that every trouble in his air-passages is of the same nature.

In the chronic form gout may appear as a general or lateral pharyngitis (p. 392), with marked local discomfort and pain shooting up to the ear. There may be much thick, tenacious phlegm, with great irritability and tenesmus in the throat; the uvula may be thickened and flabby, and small tophi may be detected below the mucosa, or concretions of urate of soda may be discharged from the surface.

In the larynx, gouty concretions may occur in the crico-arytenoid joint, causing ankylosis (p. 540), or take place in a vocal cord, simulating malignant disease. Deposits of urate of soda may occur in the submucous tissue over the crico-arytenoid joint, while the surrounding tissues and the articulation itself remain quite unaffected.*

Acute gout in the pharynx is characterized by (1) sudden, acute invasion and rapid subsidence; (2) sharp fever, and marked general symptoms; (3) intense local pain, almost out of proportion to the visible lesions; (4) symptoms which resemble those of a

* St. Bartholomew's Hosp. Mus., No. 1611A; and Norman Moore, *Trans. Path. Soc., London*, xxxiii., 1882, p. 271.

and thick, slow, drawling and fatiguing speech, which is curiously toneless and colourless. The patient may also refer to gain in weight, dyspnœa, irritability, nervousness, loss of memory, and dry skin. Examination may show nothing abnormal in the nose, or there may be hypertrophy of the inferior turbinals.* The tongue may be swollen, and tend to protrude between the teeth; the uvula and soft palate are symmetrically thick and swollen. The mucous membranes generally are pale and flabbily thickened, and the larynx is anæmic and œdematous-looking. There is no loss of sensation or motion. The other characteristic symptoms of myxœdema will be noted.

Treatment with thyroid-gland preparations brings about rapid relief of both local and general symptoms.

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S. Moritz, "On the Oral, Laryngeal, and Nasal Symptoms of Myxœdema." *Med. Chron.*, xlvii., 1907, p. 158.

ACROMEGALY

As part of this affection the bony framework of the nose becomes enlarged, and there is considerable hyperplasia of the mucous membrane, so that the tongue is enlarged, the tonsils hypertrophied, and there is thickening of the uvula, soft palate, fauces, and turbinals. The larynx enlarges, and its mucous membrane becomes thickened, especially over the epiglottis, ventricular bands, and arytenoids, and the voice is deeper and rougher. The glottis may be encroached on, leading to stridor, dyspnœa, and sudden death.†

ANGIO-NEUROTIC ŒDEMA

Synonyms.—*Quincke's œdema*; *wandering œdema*; *acute circumscribed œdema*; *urticaria tuberosa, nodosa, or gigans*.

Manifestations of this curious skin affection sometimes involve the upper respiratory tract, and owing to their alarming and possibly dangerous symptoms they are deserving of consideration.

Etiology.—There is generally a marked family history of the disease, or of asthma or allied disorders, and the patients are usually of a neurotic temperament. Attacks are caused in different individuals by different causes: cold, traumatism, worry, mental excitement, fright, or certain foods or drugs. The condition has been mistaken for manifestations of gout or rheumatism.

Pathology.—The affection is regarded as a vaso-motor neurosis in which acute circumscribed non-inflammatory swellings of the skin and mucous membranes occur without warning or apparent cause. In one post-mortem a series of transverse sections of the larynx showed that the œdema affected not only the mucous membrane but the deeper connective tissue, and even the substance of the muscles. This latter condition would prevent the abductors from causing that physiological enlargement of the aperture during inspiration

* Connal, *Glasgow Med. Journ.*, Oct., 1898.

† W. F. Chappell, *Journ. of Laryngol.*, x., 1890, No. 3, p. 1, 2.

- R. S. Morris, *Amer. Journ. Med. Sci.*, Nov., 1905. (From Epitome in *Lancet*, Sept. 23, 1905, p. 909.)
 Halstead, *ibid.*, Sept., 1905. (From Epitome in *Brit. Med. Journ.*, March 17, 1906.)
 Henry Bazett, *Lancet*, Oct. 12, 1907.
 C. A. Parker, *Proc. Roy. Soc. Med.*, Laryngol. Section, Nov., 1908, p. 27.
 Jacques, *Rev. Hebd. de Laryngol.*, xxvi., 1905, No. 16, p. 473.

HERPES

In herpes an eruption of vesicles, generally unilateral, may occur on the uvula, soft palate, faucial pillars, and occasionally the posterior pharyngeal wall or epiglottis. Sometimes it extends to the arytenoids and ventricular bands. The vesicles vary in size from a pin's head to a split pea. This first stage of vesicle formation rarely comes under observation, so rapidly do the vesicles rupture to form small, white, round, shallow ulcers. These ulcers soon become covered with a thin fibrinous exudation, simulating an aphthous ulcer. The eruption may be coincident with the appearance of herpes on the lips or face, but more commonly it occurs alone. It is generally ushered in with chilliness, fever, acute burning pain, and dysphagia. It occurs in subjects who are in poor general health, especially if overworked or worried (Plate XII., Fig. 1).

The treatment is symptomatic—rest in bed and anti-neuralgics until the pain is relieved and the fever falls, and then general and tonic treatment. A few doses of quinine, aspirin, phenacetin, or antipyrin will relieve the sharp pain. If necessary, sprays or lozenges of morphine, cocaine, or carbolic are ordered (Formulæ 5, 6, 31, and 43). A single application of a pencil of nitrate of silver to the freshly formed ulcer has a good effect.

PEMPHIGUS

Pemphigus affecting the mucous membrane of the mouth and larynx is a rare affection. It may occur in either the chronic or the acute form.

Etiology.—Pemphigus is generally secondary to the skin eruption, but occasionally the eruption makes its appearance primarily, and perhaps solely, on the mucous surfaces. The etiology is extremely obscure. Pemphigus is apt to follow on nervous strain or overwork, and is generally regarded as a tropho-neurosis. Neither sex nor age appears to influence the disease, although it is more frequently met with in the elderly and infirm. Microscopic and bacteriological examinations, and blood investigations, have yielded negative results. The disease is not epidemic, and neither clinical nor laboratory observations show it to be contagious.

especially if the bullæ are limited to mucous surfaces (Montfort and J. Charles). But Semon and others have known of death from exhaustion in prolonged and relapsing cases.*

Treatment.—Local applications have no influence whatever (J. H. Bryan). The constant irritation may be eased by alkaline washes and sedative lozenges.

Arsenic carried to the extreme of tolerance has been beneficial in some cases, and liquor opii sedativus, in increasing doses, has improved the condition for a time.

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- Lewis M. Miller, *N.Y. Med. Journ.*, July 3, 1897.
 J. W. Bryan, *ibid.*, Nov. 25, 1899.
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 J. Charles, *ibid.*, No. 38, p. 336.
 L. M. Hurd, *Laryngoscope*, xviii., 1908, No. 4, p. 310.
 Harmon Smith, *ibid.*, p. 311.
 H. J. Davis, *Proc. Roy. Soc. Med.*, Laryngol. Section, iii., 1909, p. 22, and Feb., 1910, p. 78.
 L. M. Hurd, *Laryngoscope*, xix., 1909, No. 9, p. 689.

EXUDATIVE ERYTHEMA

Under this title T. K. Hamilton describes an extremely rare condition, of which he has seen four cases. All occurred in females over 50 years of age. Two were unmarried, and in all of them the rheumatic or rheumatic-gout diathesis played a prominent part. The symptoms complained of were—irritating cough, some dysphagia, dryness of the mouth and throat (a modified form of the condition known as xerostomia), and a general feeling of malaise. Examination showed that the epiglottis was the point of selection at first, and that from it the conditions spread to the surrounding parts. The free margin of the epiglottis was covered with small, irritable-looking spots of ulceration with slightly thickened edges and somewhat excavated centres, but no induration. None of these spots of exudation ran together to form larger patches, even after several months. From the epiglottis they spread to the ary-epiglottic folds, and thence to the soft palate, tonsillar and buccal regions, and the gums and lips. There was no tendency to invade the larynx below the epiglottis, or the trachea. In two cases xerophthalmia was also present.

The condition differs from herpes and pemphigus by not running a rapid course, and by the absence of constitutional disturbance, while local symptoms are more marked.

Treatment by arsenic, and the local application of ethereal solution of nitrate of silver, is very satisfactory; but one of Hamilton's patients had to take Fowler's solution intermittently for thirteen years.†

* Cresswell Baber, *Proc. Laryngol. Soc., London*, xli., Dec., 1903, p. 64, and June, 1904, p. 181. (A fatal case.)

† T. K. Hamilton, *Journ. of Laryngol.*, xix., Dec., 1904, p. 617.

gives a ratio of 154 to 61 (von Eicken). The effects will vary with the mobility of the substance, and with the amount of obstruction it causes. If it shifts into the trachea it will give rise to the symptoms just described. It may fall back into the opposite lung. If it sticks in a bronchus there will be more obstruction of the corresponding portion of lung, indicated by want of expansion and diminished or absent respiratory murmur. A more or less fixed pain, increasing on deep inspiration, may be the only complaint. In some cases, a certain tolerance is set up, and recovery has taken place after a foreign body has been lodged in the chest for nine or more years, during which it caused no trouble beyond "winter cough." * The two parts of the respiratory passages in which foreign bodies may reside for a considerable time without exciting alarm, or, indeed, attracting much notice, are the nostrils and the bronchi. But sooner or later mischief is sure to start. Unilateral chest disease in a child, with signs of cavity and purulent expectoration, is frequently caused by the unsuspected presence of a foreign body (Godlee and Hector Cameron). Tuberculosis, dilatation and ulceration of the bronchi, bronchiectasis, consolidation and gangrene of the lung, pleurisy or abscess, and death are the usual consequences.

In the *œsophagus* the chief symptoms are pain and obstruction to the passage of food. The mucous membrane of the gullet is sometimes very tolerant; thus, I have removed by *œsophagoscopy* a tooth-plate which had been fixed in it for 2½ years, and Guisez, by the same method, has extracted a coin after 4 years. Indeed, in many cases, fatal complications seem to have been due to blind efforts at extraction, or to external *œsophagotomy*—always a serious operation.† But if the foreign body remains impacted it leads, sooner or later, to ulceration, septic cellulitis, and perforation. A pin, bone, or coin in the gullet may cause death by perforating the aorta or one of the large blood-vessels.‡ In most cases it is arrested behind the cricoid cartilage. Once arrived in the stomach, any substance is generally able to pass through the rest of the alimentary tract without doing mischief.

Examination.—When the urgency of the symptoms does not prevent it, a careful examination, under good illumination, aided by a spray of cocaine, should always be made before attempting removal. In nearly all cases it is advisable to have a tracheotomy outfit ready to hand, in case any movement on the part of the

* J. L. Bunch and R. Lake, *Lancet*, Sept. 25, 1897.

† J. Guisez, "Maladies de l'Œsophage," p. 270. Paris, 1911.

‡ Walter Rivington, *Med.-Chir. Trans.*, lxi., 1886, p. 63.

Isambard Owen, *Brit. Med. Journ.*, June 27, 1903, p. 1490.
J. Lovett, *ibid.*, May 1, 1909, p. 1064.]

cocaine in an adult, he is able to assist in this voluntarily. Otherwise the mucous membrane may be irritated with a probe. Failing this, the trachea is painted with cocaine and the substance carefully searched for, with the guidance, in some cases, of the X-ray screen.

When a tracheotomy has been performed, it is permissible to postpone further measures; for it is well known that this operation diminishes the sensibility of the larynx, and there is no longer the danger of sudden and fatal laryngeal spasm should the foreign body shift its position and become engaged in the glottis. This same diminution of the naturally extreme sensitiveness and alertness of muscular spasm in the larynx will also increase the chance of the body being safely coughed up and expelled through the larynx.*

If the foreign body is still retained in the trachea, if its situation has not been definitely located, and in all cases where it is fixed in a bronchus, the only method of detecting and removing it is by Killian's direct bronchoscopy (Fig. 264).

Such surgical measures as transmediastinal bronchotomy need only be mentioned to be emphatically condemned.

4. *In the œsophagus.*—When a foreign body has passed the entrance to the glottis there is no need for hasty action, such as ill-considered efforts at pushing it downwards or fishing it upwards. The majority of substances are arrested behind the cricoid plate, or just as the œsophagus enters the chest (Fig. 265).

A radiogram, and careful use of a bougie, will help in determining the size, shape, and situation of the obstruction; but, in all cases, Killian's direct œsophagoscopy is the method of preference both for diagnosis and treatment. It is a much simpler and less alarming procedure than is bronchoscopy. The exceptions to its use are given by Killian as follows: If it is seen that the wall of the œsophagus has been deeply injured, an early œsophagotomy is required. If the foreign body is large, has sharp edges or hooks (e.g. dental plates), all attempts at extraction are dangerous. In such cases, if the foreign body is situated no deeper than twenty-four to twenty-six cm. (10 in.) from the upper incisors, œsophagotomy is indicated; if deeper, then gastrotomy or posterior mediastinotomy is called for.† Chevalier Jackson, on the other hand, holds that external surgery has no place in treatment unless the foreign body has escaped through the œsophageal wall. In all other cases, no matter how large the body, if it has gone in by the natural passage, it can be brought out by the same route.‡

* Hector Cameron, *Internat. Clinics*, vol. iii., 2nd series.

† G. Killian, *Brit. Med. Journ.*, Aug. 30, 1902, p. 569.

‡ Chevalier Jackson, *Laryngoscope*, xix., 1909, No. 10, p. 743.

It was absolutely healthy and was at once closed up. All her symptoms promptly disappeared. Another patient excited sympathy by introducing maggots into her nostrils, even allowing them to crawl down her pharynx. Both these patients were habitual frequenters of the various out-patient departments in King's College Hospital.

Functional aphonia and dysphagia have been described on pp. 512 and 556. The symptoms of paresis of the palate may be imitated (p. 424). Recurrent membranous pharyngitis, spread over a period of nineteen years, and affecting only the *left* side, was found by Middlemass Hunt to be artificially produced, probably by liquor epispasticus.* In an analogous case, recorded by Semon, the pharyngeal ulceration was probably brought about by nitric acid.†

Conscripts have been known to escape duty by producing artificial membranous sore throats, resembling diphtheria, by rubbing in powdered cantharides with the finger. A hysterical patient of Chevalier Jackson, to excite interest, acquired the knack of aspirating tin-tacks into her bronchi.‡

The most astonishing case of malingering is probably that of Lack's, where a man successfully enacted the symptoms of laryngeal stridor and allowed a tracheotomy to be performed in order that he might enjoy the rest of a comfortable hospital bed.§

* *Journ. of Laryngol.*, Feb., 1898.

† *Trans. Clin. Soc.*, xxviii., 1895, p. 108.

‡ *Laryngoscope*, xix., 1909, No. 12, p. 936.

§ *Clin. Journ.*, Feb. 5, 1896, p. 227.

stenosis). Three tubes of likely size should be selected, sterilized, threaded with stout silk, and lubricated with glycerin or mentholized oil.

An assistant and a nurse are required. The latter wraps the child in a sheet, so as to envelop both arms and legs, and seats him on her lap, fixing his legs between her knees. With her left hand she holds the child's body and restrains his arms, while

Fig. 277.—Intubation.

With the left forefinger the operator locates the position of the entrance to the larynx, taking care that the very pliable epiglottis of a child is not doubled back.

her right hand on his forehead keeps the head firmly fixed against her chest (Fig. 37, p. 44). The assistant stands behind the nurse to help in steadying the child, while he introduces the gag from the left side.

The surgeon's left forefinger is now passed down to the base of the tongue until he feels the epiglottis, which, in a child, readily doubles backwards over the orifice of the larynx. The tip of the examining finger then tilts the epiglottis forwards into place, and locates the entrance of the larynx (Fig. 277). With the right hand the surgeon takes the introducer and carries the tube towards the larynx, first horizontally, and then vertically, until the tip is felt between the pulp of the examining finger and the epiglottis (Fig. 278).

larynx, and then forwards. If there is no string, the extractor is used on the same lines as those indicated for effecting the intubation.

Enucleation of the tube is in favour in France. The child's head is extended so as to render the larynx prominent. By applying the thumb and forefinger of the right hand on each side and below the cricoid ring, and then pressing upwards, the intubation tube can be shot into the mouth "like a stone from a plum."

After-treatment.—The patient should not be left for half an hour after extraction, in case of—

- (a) Œdema of the larynx, which might require introduction of a smaller tube.
- (b) Spasm of the glottis, with, possibly, convulsions.
- (c) Paralysis of the dilator (abductor) muscles of the larynx.
- (d) Subglottic false membrane.

All these events would require the reintroduction of the tube.

During the operation, as well as in the early after-treatment, a tracheotomy outfit should always be at hand in case of emergencies.

Other details, so far as diphtheria is concerned, will be found at p. 685.

LARYNGOTOMY

A temporary opening through the crico-thyroid membrane (Fig. 282, c, p. 723) is indicated (1) in emergencies of sudden laryngeal stenosis, (2) when the necessary instruments for an urgent tracheotomy are not at hand, or (3) as a preliminary and temporary measure in operations on the upper air-passages. This last indication is with the object of (a) making such operations less dangerous; (b) facilitating operation, by suspending the respiration through the mouth and so avoiding coughing and constant sponging; (c) allowing regular administration of the anæsthetic; or (d) avoiding a preliminary tracheotomy. Thus laryngotomy may help to make operations in the throat and nose more easy, rapid, and efficient. In other circumstances a tracheotomy is preferable. The operation is unsuitable for children, owing to the small size of the larynx (cf. Fig. 206, p. 446).

Laryngotomy is thus described by J. W. Bond: The patient's head is extended and held straight in the middle line. (1) An assistant pinches up a vertical fold of skin, so that the centre of it is at the level of the upper border of the cricoid cartilage when the head is extended. (2) The centre of this uplifted fold is then transfixed and cut through so as to make a transverse cut 1 inch in length. (3) A pair of sharp-pointed scissors, curved on the flat, is plunged through the crico-thyroid membrane downwards and

TRACHEOTOMY

Indications.—1. Injuries to the larynx—wounds and fractures of the laryngeal cartilages.

2. The extraction of foreign bodies when these are impacted in the larynx, or cannot be removed from the trachea or bronchi by the endolaryngeal route.

3. Stenosis of the larynx or trachea (*see* pp. 536 and 543).

(a) External compression: goitre, aneurysm, mediastinal growths (*see* p. 544).

(b) Internal constriction: inflammatory swelling, tuberculosis, syphilis, diphtheria, scleroma, neoplasms (carcinoma, papilloma, etc.).

(c) Cicatricial narrowing, after healing of ulcers (syphilitic, typhoid, etc.) or operative measures.

(d) Congenital webs in the larynx.

(e) Double abductor paralysis.

4. (a) As a preliminary procedure to operations on the upper air-passages, so as to prevent (by a tampon cannula or by plugging the larynx) the descent of blood into the bronchi. (b) Following these operations, to supply air to patient.

5. In asphyxia, to allow of artificial respiration.

Surgical anatomy.—The trachea is situated exactly in the middle line of the body. The laryngeal end of the tube lies close below the superficial structures of the neck. The suprasternal part of it is much deeper, for, in addition to the two layers of cervical fascia crossing from the muscles of one side to those of the other, it is separated from the skin by a considerable layer of cellular tissue containing numerous veins. The muscles overlap the sides of the trachea, but in the middle line they leave a strip of trachea covered only by the cervical fascia. The thyroid gland lies on each side of the trachea, the isthmus crossing between the 3rd and 4th rings. The opening made into the trachea above the isthmus is called a high tracheotomy, that below the isthmus a low tracheotomy (Fig. 282). But in practice the operation does not necessarily fall into one or other of these divisions, as it is often necessary to carry the incision through the thyroid isthmus. This latter opening—median tracheotomy—is required when a tampon cannula is introduced as a first step for operation on the larynx. Of the sixteen to twenty rings of the trachea, not more than seven or eight are above the manubrium sterni. The distance between the cricoid cartilage and the sternal notch varies with the length of neck, the age of patient, and the position of the head. In the

child should be enveloped in a thin macintosh sheet, which serves to restrain the arms. A small square pillow or sand-bag, or a good-sized block of wood, is placed beneath the shoulders, so that the head falls well backwards, the neck is over-extended, and the trachea is projected forwards. If the occiput does not quite rest on the table, a folded towel should be placed beneath to give

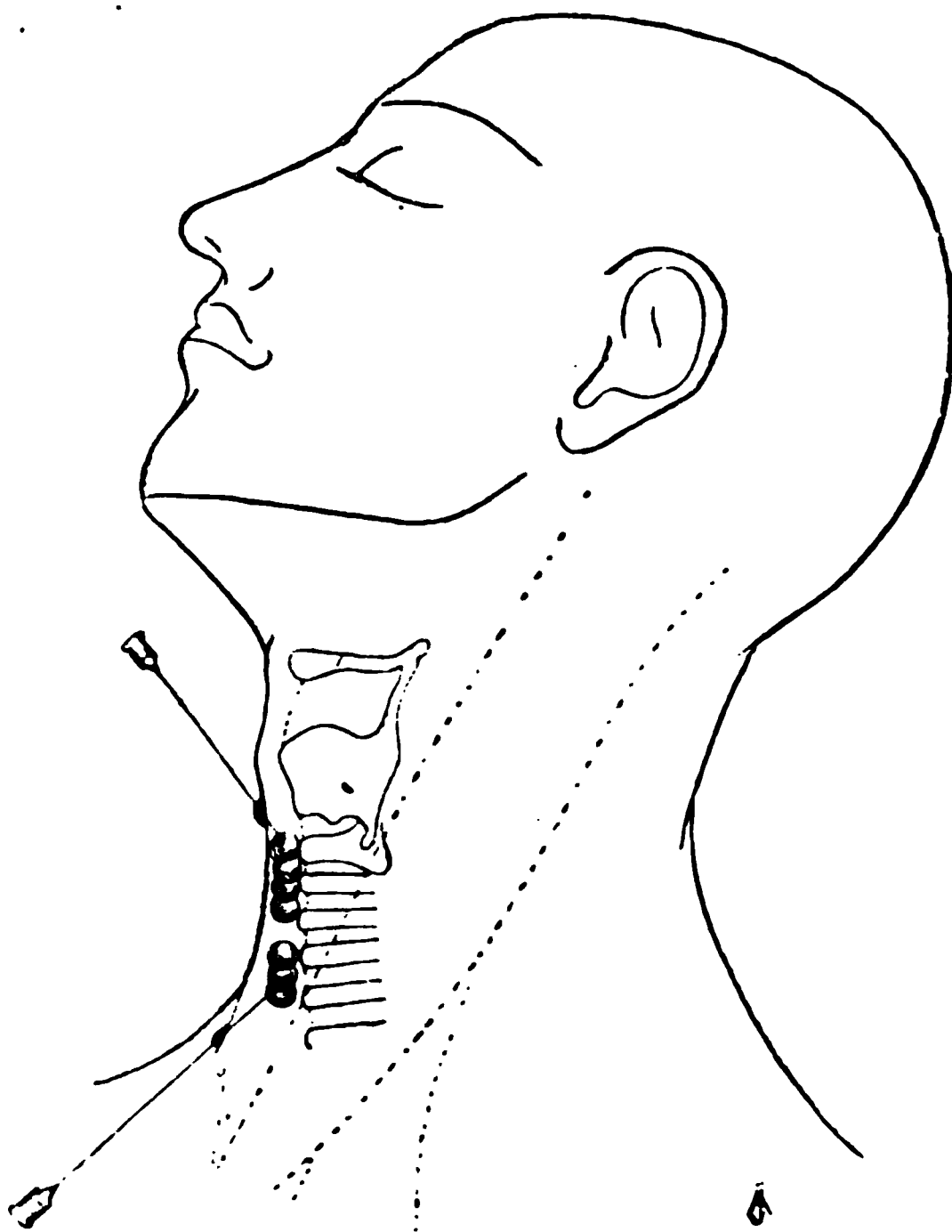


Fig. 283.—Tracheotomy under local anæsthesia.

Semi-diagrammatic drawing showing the spots on the skin where a drop of pure carbolic acid is deposited. The needle is inserted through these points, and the cocaine-adrenalin or eudrenine solution is slowly injected.

support and steadiness. It is of great importance for the safe and easy execution of the operation that this position be assured, and throughout the operation the chin and the sternal notch should be rigidly kept in the mid-line of the body. This is best done by letting one assistant support the head and devote himself entirely to maintaining this position.

Operation.—Standing on the patient's right, the operator grasps the sides of the larynx with the thumb and second finger of the left hand, the forefinger as a guide resting on the notch of the thyroid

necked baby, and if the operation has to be done swiftly for urgent dyspnœa or sudden asphyxia. The dissection is then deep and difficult, the veins are gorged with blood, the patient may be restless, and the operator requires all his presence of mind not to lose track of the trachea. It is then better to do the high operation first, or divide the prominent cricoid, or perform a simple laryngotomy (p. 720), then introduce a cannula, and wait until the respiration becomes regular, the cyanosis subsides, or secretions are expelled. The front of the neck can then be dissected without haste, and the low tracheotomy completed.

The following points are worth bearing in mind :—

1. If urgency permits, everything should be prepared beforehand, and within reach of the surgeon's own hands.

2. The "tracheotomy position" must be carefully arranged.

3. The cutaneous incision should be liberal, as it facilitates separation and seizure of the veins.

4. During the early part of the operation the surgeon should not lose his grasp of the larynx with the thumb and second finger of the left hand. The forefinger can descend from time to time to verify the situation of the trachea and palpate the rings.

5. If at any time the relationship of the parts becomes confused they should be allowed to resume their natural position, and, starting from the larynx, the situation of the trachea can again be verified.

6. No attempt should be made to enter the trachea until it has been seized with a tenaculum. When there is no assistant, the hook should be introduced in the middle line, and held in the operator's left hand, while he incises the rings with the right.

7. Although, if possible, all bleeding should be checked before the windpipe is opened, this need not be adhered to in the presence of urgent dyspnœa, for once the cannula is introduced the venous congestion rapidly subsides as free respiration is established. If the hæmorrhage continues, it is a good plan to roll the patient well over on his side, so that the blood does not find its way into the lungs. In this position respiration becomes normal, the hæmorrhage diminishes, and can easily be checked by pressure- or catch-forceps.

8. If some blood does enter the trachea and the patient struggles to expel it, he should be allowed, if not under a general anæsthetic, to sit up.

9. A child may cease breathing soon after the trachea is opened, and this naturally alarms the young operator. As a rule this is really a condition of apnœa consequent on the exceptionally deep breath inhaled as soon as the opening was made. If the patient is

without the tube. In the first instance this is only done in the presence of the surgeon, and for periods not exceeding half an hour.

When the tube has to be worn indefinitely, as in some cases of double abductor paralysis, cancer, syphilis or tubercle, special care is taken to avoid irritation and ulceration in the trachea. The flexible rubber tube known as Morratt Baker's may then be employed, although, on account of its softness, it should not be used until the opening has been fairly established. Durham's



Fig. 288.—A large-size Durham's cannula, recommended by the author in the case of a low tracheotomy in a stout subject.

lobster-tail tube is, however, the most suitable, as the shield can be moved to fit the depth of the neck, and the extremity is pendulous in the trachea and can exert no pressure (Figs. 287 and 288).

THYROTOMY OR LARYNGO-FISSURE

Indications.—Splitting the larynx, so as to deal directly with intralaryngeal conditions, may be required for—

1. Impacted foreign bodies in the larynx.
2. Injuries to the larynx.
3. Laryngocele.
4. Stenosis of the larynx.
5. Acute laryngeal perichondritis.
6. Laryngeal tuberculosis, including lupus.
7. Scleroma of the larynx.
8. Neoplasms in the larynx—(a) innocent, and (b) malignant.

Anæsthesia.—The operation is generally performed under chloroform. After the trachea has been opened the patient is allowed to come round a little from the anæsthetic so as to cough and expel any blood. Indeed, he should be kept as lightly as possible under the chloroform during the rest of the operation.

FORMULÆ

In the following prescriptions the quantities are given in both English and metric measures. In several instances the amount ordered is sufficient to make a compressed tablet—a convenient form in many cases for preparing fresh, warm lotions.

LOCAL ANÆSTHETICS

FORMULA 1

R	Cocainæ hydrochloridi	.	gr. xlviii ad xcvi	.	3·3 to 6·6	gram.
	Acidi salicylici	.	gr. $\frac{1}{2}$	.	0·034	gram.
	Aquam destillatam.		ad $\frac{3}{4}$ i	.	to 30·0	c.c.

The above 10-20 per cent. solution of cocaine is intended for the use of the surgeon himself, and should never be entrusted to the patient.

FORMULA 2

In the following prescription the addition of phenazone somewhat increases the anæsthetic action, while the thymol solution helps, like the salicylic acid in the previous formula, to preserve the solution.

R	Cocainæ hydrochloridi	.	gr. x ad xx	.	0·65 to 1·37	gram.
	Phenazoni	.	gr. xl	.	2·6	gram.
	Liquoris thymol alcoholici	.	℥ ii	.	0·12	c.c.
	Aquam destillatam	.	ad $\frac{3}{4}$ i	.	to 30·0	c.c.

FORMULA 3

R	Cocainæ hydrochloridi	.	gr. xv	.	1·0	gram.
	Menthol	.	gr. xv	.	1·0	gram.
	Acidi carbolici puri	.	gr. xv	.	1·0	gram.
	Liquoris adrenalin (1-1,000)	.	gr. $\frac{1}{4}$	.	0·001	gram.

(Bonain.)

This local anæsthetic mixture is chiefly of use in small operations on the outer ear. It is somewhat too caustic in the nose. But it is useful when applied to the tonsil or on a peritonsillar abscess before puncturing.

FORMULA 4

R	Orthoformi	.	gr. xv	.	1·0	gram.
	Iodoformi	.	gr. xv	.	1·0	gram.
	Menthol	.	gr. iii	.	0·2	gram.

Insufflation in dysphagia. A few grains for a dose.

FORMULÆ

FORMULA 9

Compound Nasal and Carbolic

R	Sodii bicarbonatis	.	.	gr. iii	.	.	.	0.20	gram.
	Sodii biboratis	.	.	gr. iii	.	.	.	0.20	gram.
	Acidi carbolic	.	.	gr. i	.	.	.	0.06	gram.
	Sacchari albi	.	.	gr. v	.	.	.	0.32	gram.

Water to 3 or 4 oz., or the above quantity of drugs can be dispensed in a compressed tablet.

The carbolic renders the nose wash a little more soothing and antiseptic. It should not be ordered in chronic cases, for fear of injuring the sense of smell.

FORMULA 10

Such antiseptics as sanitas fluid, listerine, etc., may be added to any of the above alkaline lotions. Several alkaline and compound antiseptic fluids are sold in concentrated form, of which the following are good specimens:—

R	Sodii bicarbonatis	.	.	gr. viii	.	.	.	0.52	gram.
	Sodii biboratis	.	.	gr. iv	.	.	.	0.26	gram.
	Sodii chloridi	.	.	gr. viii	.	.	.	0.52	gram.
	Sodii sulphatis	.	.	gr. iii	.	.	.	0.20	gram.
	Sodii phosphatis	.	.	gr. i	.	.	.	0.06	gram.
	Menthol	.	.	gr. $\frac{1}{2}$	.	.	.	0.032	gram.
	Thymol	.	.	gr. $\frac{1}{4}$	.	.	.	0.016	gram.
	Eucalyptol	.	.	℥ $\frac{1}{8}$	.	.	.	0.008	c.c.
	Olei pini pumilionis	.	.	℥ $\frac{1}{8}$	.	.	.	0.008	c.c.
	Glycerini	.	.	℥ $\frac{1}{2}$	.	.	.	3.5	c.c.
	Chloretone	.	.	gr. $\frac{1}{4}$	.	.	.	0.016	gram.
	Aquam destillatam	.	.	ad ℥i	.	.	.	to 30.0	c.c.

One part in 3 to 6 of warm water.

FORMULA 11

R	Sodii bicarbonatis	.	.	℥ii	.	.	.	8.0	gram.
	Sodii biboratis	.	.	℥ii	.	.	.	8.0	gram.
	Listerine	.	.	℥i	.	.	.	30.0	c.c.
	Glycerini	.	.	℥iv	.	.	.	115.0	c.c.

A teaspoonful in 2 fluid oz. (60.0 c.c.) of water as a nose lotion.

FORMULA 12

The following is the formula of a nose lotion for obstinate cases of tertiary syphilis:—

R	Hydrargyri perchloridi	.	.	℥ss	.	.	.	2.0	gram.
	Alcoholis	.	.	℥iiss	.	.	.	100.0	gram.

For use, add ℥i (3.5 c.c.) to 1 quart (practically 1 litre) of tepid salt-and-water.

The above concentrated solution is highly poisonous.

INHALATIONS (VAPORES)

In the following formulæ the quantities given are generally prescribed for 1 oz., of which a teaspoonful (60 drops) is added to a pint jug of steaming water at 130° to 140° F. (54.4° to 60.0° C.). **A cone**

DRY INHALATIONS (VAPORES SICCI)

Any of the volatile oils can be used as dry inhalations. Menthol and camphor can be inhaled from the solid crystals.

Many of them can be prescribed with alcohol, and inhaled from a Burney Yeo inhaler (Fig. 293).

FORMULA 19

R Chloroformi ʒss 15 c.c.
Spiritus vini rectificati ʒss 15 c.c.

Twenty to 60 drops are sprinkled on a handkerchief, and inhaled for spasmodic laryngitis, paroxysmal coryza, etc. Not more than 3 teaspoonfuls to be used on any single occasion, except in the presence of a medical man.

FORMULA 20

R Menthol gr. xv 1·0 gm.
Chloroformi ʒss 15·0 c.c.

A few drops can be inhaled in spasmodic rhinitis.

Fig. 293.—Burney Yeo's inhaler.

FORMULA 21

R Creosoti } partes æquales
Spiritus chloroformi }
Spiritus vini rectificati }

A few drops on the sponge of an inhaler.

FORMULA 22

R Acidi carbolici ʒii 8·00 gm.
Creosoti ʒii 7·00 c.c.
Tincturæ iodi ʒi 3·50 c.c.
Spiritus ætheris ʒi 3·50 c.c.
Spiritus chloroformi ʒii 7·00 c.c.

Six to 8 drops on the inhaler every hour.*

* David R. Lees, "Incipient Pulmonary Tuberculosis," *Brit. Med. Journ.*, Dec. 11, 1909, p. 1693.

FORMULÆ

FORMULA 30

- ℞ Salol gr. xc 6·0 gm.
 Tincturæ myrrhæ ʒ vi 21·0 c.c.
 Spiritus vini rectificati ad ʒ iii to 90·0 c.c.
 One teaspoonful in $\frac{1}{2}$ pint of water, for a gargle.

FORMULA 31

- ℞ Acidi carbolici gr. iiss 0·16 gm.
 Morphinæ hydrochloridi gr. i ad ii 0·06 to 0·13 gm.
 Cocainæ hydrochloridi gr. ii ad iv 0·13 to 0·26 gm.
 Menthol gr. iv 0·26 gm.
 Glycerini ʒ iiss 13·5 c.c.
 Aquam destillatam ad ʒ iv to 115·00 c.c.

Use as a spray, three or four times a day before food. Use an alkaline mouth wash after spraying, so as not to carry the anæsthetic drug into the stomach.

Antiseptic and alkaline spray in painful affections of pharynx and larynx (tubercle, cancer). (E. J. Moure.)

FORMULA 32

- ℞ Acidi carbolici gr. l 3·2 gm.
 Sodii biboratis gr. lx 4·0 gm.
 Potassii bromidi gr. lx 4·0 gm.
 Spiritus menthæ piperitæ. ʒ ss 15·0 c.c.
 Glycerinum ad ʒ iv to 115·0 c.c.

A teaspoonful in half a tumblerful of tepid water.

Cleansing and soothing gargle, useful after evacuating peritonsillar abscess.

FORMULA 33

- ℞ Aluminis gr. lx 4·0 gm.
 Acidi tannici gr. lxxx 5·3 gm.
 Aquam destillatam ad ʒ x to 280·0 c.c.

Astringent.

FORMULA 34

- ℞ Boracis ʒ ii 8·0 gm.
 Glycerini ʒ ii 7·5 c.c.
 Tincturæ myrrhæ ʒ ii 7·5 c.c.
 Aquam destillatam ad ʒ vi to 170·0 c.c.

Mild alkaline and astringent.

FORMULA 35

- ℞ Potassii chloratis gr. lxxx 5·0 gm.
 Lotionis nigræ (B.P.) ʒ viii 230·0 c.c.

To be mixed with an equal quantity of tepid water before use.

In syphilis.

FORMULA 36

- ℞ Hydrargyri perchloridi gr. i $\frac{1}{2}$ 0·11 gm.
 Sodii salicylatis gr. 3 $\frac{1}{4}$ 0·25 gm.
 Aquam destillatam ad ʒ iv to 115·0 c.c.

Thirty to 60 drops in a wineglass of water, as a gargle in syphilis. (As this is a concentrated solution, the bottle should be carefully labelled.)

FORMULÆ

Borax, chloride of ammonium, chlorate of potash, or bromide of potassium are best ordered in the form of compressed tablets.

Morphine and codeine can be ordered in the preparations of the British Pharmacopœia.

FORMULA 42

R	Menthol	.	.	.	gr. $\frac{1}{2}$	.	.	.	0.008 grm.
	Extracti glycyrrhizæ	.	.	.	gr. ii	.	.	.	0.13 grm.

A useful sedative lozenge, of small bulk.

FORMULA 43

R	Menthol	.	.	.	gr. $\frac{1}{20}$	.	.	.	0.0032 grm.
	Acidi carbolic	.	.	.	gr. $\frac{1}{4}$	.	.	.	0.016 grm.

Useful local sedative.

FORMULA 44

R	Acidi carbolic	.	.	.	gr. $\frac{1}{4}$	.	.	.	0.016 grm.
	Olei cinnamomi	.	.	.	$\mathfrak{M}_{\frac{1}{2}}$	.	.	.	0.0032 grm.

FORMULA 45

R Trochisci glycyrrhizæ et anisi.

A harmless and helpful lozenge in the Pharmacopœia of the Brompton Hospital.

FORMULA 46

R	Formalin	.	.	.	gr. $\frac{1}{2}$.	.	.	0.008 grm.
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A loose chemical combination of formic aldehyde and lactose is made up into tablets and sold under various trade names, and they appear to be satisfactory, non-toxic, and trustworthy local antiseptics.

MIXTURES

FORMULA 47

R	Morphinæ	.	.	.	gr. $\frac{1}{2}$ ad $\frac{1}{2}$	.	.	.	0.016 to 0.02 grm.
	Spiritus ætheris nitratis	.	.	.	$\mathfrak{Z}i$	.	.	.	3.5 c.c.
	Liquoris ammonii acetatis	.	.	.	$\mathfrak{Z}iii$	.	.	.	10.5 c.c.
	Aquæ camphoræ	.	.	.	$\mathfrak{Z}iss$	.	.	.	45.0 c.c.

The draught at bedtime.

In the initial stage of acute rhinitis.*

FORMULA 48

R	Sodii salicylatis	.	.	.	gr. x ad xx	.	.	.	0.65 to 1.30 grm.
	Phenazoni	.	.	.	gr. v	.	.	.	0.32 grm.
	Spiritus ammoniæ aromatici	.	.	.	$\mathfrak{M}xv$	.	.	.	0.9 c.c.
	Elixir rubri	.	.	.	$\mathfrak{M}xv$ ad $\mathfrak{M}l$	.	.	.	0.9 c.c. to 3.3 c.c.
	Aquam cinnamomi	.	.	.	ad $\mathfrak{Z}i$	.	.	.	to 30.0 c.c.

In early stages of influenza, catarrh, and painful pharyngeal affections.

* Burney Yeo, *Practitioner*, May, 1907.

FORMULÆ

FORMULA 55

R	Potassii citratis	.	.	gr. xv	.	.	.	1·0	grm.
	Liquoris ammonii acetatis			℥ii	.	.	.	7·0	c.c.
	Tincturæ scillæ	.	.	℥xii	.	.	.	0·7	c.c.
	Vini ipecacuanhæ	.	.	℥x	.	.	.	0·6	c.c.
	Aquam anisi	.	.	ad ℥i	.	.	.	to 30·0	c.c.

Cough at night, especially of emphysematous and chronic bronchitic character.

FORMULA 56

R	Bismuthi carbonatis	.	.	gr. x	.	.	.	0·65	grm.
	Magnesii carbonatis	.	.	gr. xv	.	.	.	1·0	grm.
	Acidi hydrocyanici diluti			℥iv	.	.	.	0·24	c.c.
	Liquoris potassæ	.	.	℥x	.	.	.	0·6	c.c.
	Pulveris tragacanthæ com-								
	positi	.	.	gr. v	.	.	.	0·32	grm.
	Aquam menthæ piperitæ			ad ℥i	.	.	.	to 30·0	c.c.

To be taken half an hour before food.

In pharyngeal affections associated with digestive troubles.

FORMULA 57

R	Pulveris rhei	.	.	gr. v	.	.	.	0·32	grm.
	Ammonii carbonatis	.	.	gr. v	.	.	.	0·32	grm.
	Infusi quassiæ	.	℥ss	.	.	.	.	15·0	c.c.
	Aquam menthæ piperitæ			ad ℥i	.	.	.	to 30·0	c.c.

To be taken before meals.

In dyspeptic conditions with pharyngeal symptoms.

FORMULA 58

R	Ferri et ammonii citratis	gr. v ad xv	.	.	0·32 to 1·0	grm.
	Liquoris arsenicalis	℥iv	.	.	0·24	c.c.
	Infusum quassiæ	ad ℥i	.	.	to 30·0	c.c.

FORMULA 59

R	Sodii salicylatis	.	.	℥iv	.	.	.	15·0	grm.
	Tincturæ ferri perchloridi			℥iv	.	.	.	15·0	grm.
	Acidi citrici	.	.	gr. x	.	.	.	0·65	grm.
	Glycerini	.	.	℥iss	.	.	.	45·0	c.c.
	Olei gaultheriæ	.	.	℥viii	.	.	.	0·5	c.c.
	Liquor ammonii citratis	ad	℥iv	.	.	.	to	115·0	c.c.

Dose, 1 to 2 teaspoonfuls.

Acute tonsillitis in anæmic subjects.

FORMULA 60

R	Potassii iodidi	.	.	gr. xv	.	.	.	1·0	grm.
	Ammonii carbonatis	.	.	gr. v	.	.	.	0·32	grm.
	Ferri et ammonii citratis	gr. x	.	.	.	.	.	0·65	grm.
	Spiritus chloroformi	.	℥x	.	.	.	.	0·65	c.c.
	Aquam destillatam	.	ad ℥i	.	.	.	.	to 30·0	c.c.

Iodide of potassium in a tonic mixture.

FORMULÆ

OILY SOLUTIONS

The oily solutions that follow are intended for the nose or throat. In many cases the spray is directed through the nose, and inhaled into the larynx and trachea. They require a special spray, often called an atomizer. When required in a form to reach the bronchi and lungs, these oily liquids must be used in a nebulizer.

They may also in many cases be employed with advantage as paints, being applied to the parts by means of cotton-wool mops or small camel's-hair pencils.

Liquid paraffin and the hydrocarbon oils, known under various trade names, can be used unmedicated or as a basis for various drugs.

Fig. 294.—Laryngeal "aquolic" atomizer.

FORMULA 66

R	Menthol	.	.	.	gr. v ad xxx.	.	0.32 to 2.0	gram.
	Paraffinum liquidum	.	.	.	(B.P.)	.	ad ʒi	.
		.	.	.		.		to 30.0 c.c.

Useful as an emollient, anæsthetic, and antiseptic.

FORMULA 67

R	*Camphor-menthol	.	.	.	gr. v ad x	.	0.32 to 0.64	gram.
	Paraffini liquidi benzoinati	.	.	.	f ʒi	.		30.0 c.c.

In coryza, hay-fever, intumescent rhinitis, hypertrophic rhinitis, pharyngitis, acute laryngitis, tracheitis, bronchitis.

Or a few drops of camphor-menthol can be added to hot water and the steam inhaled.

FORMULA 68

R	Thymol	.	.	.	gr. i	.	0.065	gram.
	Menthol	.	.	.	gr. x	.	0.65	gram.
	Eucalyptol	.	.	.	℥i	.	0.065	c.c.
	Paraffini liquidi	.	.	.	ʒi	.	30.0	c.c.

For painting or spraying on atrophic surfaces.

* Equal parts by weight of camphor and menthol rubbed together until liquefied.

FORMULÆ

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FORMULA 69

R̄	Chloretone	.	.	.	gr. xv	.	.	.	1·0	grm.
	Camphoræ	.	.	.	gr. xl	.	.	.	2·5	grm.
	Menthol	.	.	.	gr. xl	.	.	.	2·5	grm.
	Olei cinnamomi	.	.	.	℥ viii	.	.	.	0·5	c.c.
	Paraffini liquidi	.	.	.	℥ iii	.	.	.	93·5	c.c.

Antiseptic and sedative inhalant.

FORMULA 70

R̄	Unguenti hydrargyri nitratis	gr. xl	.	.	.	2·6	grm.
	Olei amygdalæ	℥ ss	.	.	.	15·0	c.c.
	Olei olivæ	℥ ss	.	.	.	15·0	c.c.

Mercurial and antiseptic.

PIGMENTA (SOLUTIONS FOR LOCAL APPLICATION)

The various caustic paints have been referred to in the text, and their method of application is described on p. 64.

FORMULA 71

Pigmentum Mandl (Iodine Paint)

R̄	Iodi puri	.	.	.	gr. vi	.	.	.	0·4	grm.
	Potassii iodidi	.	.	.	gr. xx	.	.	.	1·3	grm.
	Olei menthæ piperitæ	.	.	.	℥ v	.	.	.	0·3	c.c.
	Glycerini	.	.	.	℥ i	.	.	.	30·0	c.c.

This is a favourite stimulant and antiseptic paint. The strength of the iodine can be increased.

FORMULA 72

R̄	Resorcini	.	.	.	gr. v	.	.	.	0·32	grm.
	Glycerinum boracis.	ad	℥ i	.	.	.	.	to	30·0	c.c.

Antiseptic.

FORMULA 73

R̄	Resorcini	.	.	.	℥ i	.	.	.	4·0	grm.
	Spiritus menthæ piperitæ	.	.	.	℥ xxv	.	.	.	1·5	c.c.
	Glycerinum	.	.	.	ad ℥ i	.	.	to	30·0	c.c.

For painting the tonsils to reduce congestion before removal.

UNGUENTA (OINTMENTS)

FORMULA 74

R̄	Menthol	.	.	.	gr. i	.	.	.	0·065	grm.
	Acidi borici	.	.	.	gr. v	.	.	.	0·32	grm.
	Olei gaultheriæ	.	.	.	℥ i	.	.	.	0·065	c.c.
	Lanolini	.	.	.	℥ ii	.	.	.	8·0	grm.
	Vaselini	.	.	.	℥ vi	.	.	.	23·0	grm.

A pleasant sedative and antiseptic ; very useful after nasal operations.

FORMULA 75

R Unguenti hydrargyri nitratis
 diluti ʒi 4·0 grm.
 Vaselinum ad ʒi to 30·0 grm.

Weak mercurial ointment.

FORMULA 76

R Unguenti hydrargyri nitratis
 diluti gr. xx 1·3 grm.
 Pulveris zinci oxidi gr. xl 2·6 grm.
 Lanolini } āā ad ʒi to 30·0 grm.
 Vasellini }

Useful in fissures and other affections of the vestibules of the nose.

FORMULA 77

R Menthol gr. xx 1·3 grm.
 Acidi carbolicī ℥x 0·6 c.c.
 Olei olivæ ʒii 7·0 c.c.
 Unguenti zinci oxidi ʒss 15·0 grm.

For relief of hay-fever.

FORMULA 78

R Ichthyol ʒi 4·0 grm.
 Coumarini gr. ii 0·13 grm.
 Unguenti paraffini ʒv 20·0 grm.

Antiseptic and sedative. Introduced into the nose in chronic coryza and ozæna.

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